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FEMUR FRACTURES: STATISTICS OF END-RESULTS.*

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The educational value of fracture statistics to our profession, to the Workmen's Compensation insurance companies, and to the public is just being taught, and when fully understood and appreciated, it will very materially improve the efficiency of our treatment of fractures.

Wherever one studies the statistics of accidents it is universally found that collapse of structure and falls of materials cause the larger number of accidents, and the results of these accidents are wounds and fractures. The relative severity of these injuries is best illustrated by the consideration of the time lost as a result of them, and the highest average loss shown by any of the injuries is due to fractures.

To illustrate with a specific example from the 1913 Annual Report of the Industrial Insurance Department of the State of Washington: 12,380 cases of accidents received $465,000 compensation for 340,000 days of disability. Among these were 1,383 cases of fractures which received $122,000 for 90,000 days of disability; that is, the fractures, which constituted only 10 per cent. of the total injuries, received 27 per cent. of the total compensation. Furthermore, 266 cases, or 20 per cent., of all fractures still suffered some permanent partial disability. Similar conditions could be shown wherever accurate detailed records have been tabulated, but in this country, up to the present time, there are scarcely any similar statistics. However, experts for the Workmen's Compensation commissions will secure such statistics during the coming years. When these facts become sufficiently widely known and understood, employers of labor who must actually pay the costs of compensation, will demand that the present length of disability be diminished. This has become a question of economics and we must thoroughly appreciate that compensation laws will demand the same increased efficiency from our methods of treatment as is being secured in all other branches of industry.

Many surgeons feel that numbers of the "bad set" fractures which become useful only after twelve to eighteen months might be just as good after four to six months, if more efficiently treated. During the last two years, as our profession has been more carefully investigating the end-results after fracture, surgeons have become *convinced* that the *results must be improved*. The public, since the advent of *x*-rays, has become better educated and are demanding shorter and more efficient treatment, a briefer period of disability with better functional results.

Up to the last three years the general profession believed that fractures were being treated satisfactorily. This was due to the fact that the surgeons did not follow up their patients to the end, and therefore were ignorant of the final results. A few surgeons who kept patients under careful observation for longer periods became convinced that the average results were very unsatisfactory. They believed these bad results were due to inefficient treatment, but their conclusions are not generally accepted and will not be approved until demonstrated by a large mass of reliable statistics collected from various sources. The wide experience of many surgeons must thus be brought together in an authoritative form, and subjected to critical analysis to disclose all the results under past and present methods.

It therefore becomes most necessary to establish authoritative standards by which subsequent fracture work can be measured and compared. Only in this way can the average duration of disability be determined. This will become of great value both for the instruction of lawyers and courts and for the protection of the surgeons.

The Fracture Committee of the American Surgical Association earnestly desires every surgeon to report before May, 1915, all fractures of the lower extremities in which the final *result is definitely known.*

Every surgeon knows when discussing present standards that wide discrepancies are glaringly apparent. If one would learn about fractures he

*Read before New York and New England Association of Railway Surgeons, Oct. 21, 1914.

should not read books, but visit the law courts and listen to an unfortunate doctor explaining what a "satisfactory result" is. This too elastic phrase has become obsolete, for it did not conform to any uniform standard.

Fracture of the femur occurs in about ten per cent. of all fractures and offers by far the greatest difficulties in its treatment. As its injury most seriously incapacitates the workman, it is of unusual importance to investigate the end-results of the present methods of treatment and to suggest how these may be improved.

The following authorities present the statistics of end-results which are at present most available for study:

1. Von Bergmann reports 121 cases in which 39, or 32 per cent., fully recovered, the average period of disability being 54 weeks.

2. The British Fracture Committee reports 727 cases, of which 298 were over 15 years of age. Of 87 fractures of the neck, 20, or 23 per cent., recovered good function; of 49 fractures of the upper third, 23, or 47 per cent., recovered good function; of 108 fractures of the middle third, 53, or 49 per cent., recovered good function; of 54 fractures of the lower third, 30, or 55 per cent., recovered good function.

The 126 cases including all groups averaged only 42 per cent. of good function.

In 179 cases the average period of disability was 33.6 weeks. In 21 cases, or 11 per cent., the disability was permanent.

3. Scudder reported 35 cases, of which 16 were adults (between 18 and 48 years of age). Of these, only 5, or 31 per cent., were perfect. The working capacity of the remaining 11 was depreciated by limited knee-joint movements, pain after working, lameness in walking, weakness in the whole leg, and lack of endurance.

4. Hitzrot reported 20 adults between 15 and 76 years of age. Of 16 cases treated by non-operative methods, 15 recovered perfect function within 52 weeks. In 4 cases where the overriding could not be reduced, operation was performed and good function was secured within 52 weeks.

5. Ashhurst traces 21 cases out of 58 treated in the Episcopal Hospital, Philadelphia. Five recovered perfect function, 8 others were able to work but still limped, so he concluded 13, or 62 per cent., secured useful limbs. However, of these 21 cases, 11 were under 16 years of age.

6. Faltin, after studying the compensation awards made by the insurance companies in Sweden, reported the average period of temporary disability at seven months and that partial disability continued for three to four months longer.

The above statistics have been collected from surgical literature and we already see that the widest variations and obvious inaccuracies exist. Thus far, the different states have not yet classified their statistics sufficiently to give the data of different fractures, such as femur, tibia, etc. In 1912, Minnesota published its 13th Report of the Bureau of Labor. In 1,230 of the various fractures recorded during 1910, 1911, and 1912, under the compensation law, 467 were classified as fractures of the hip, thigh, knee, and ankle. No statement was made regarding the percentage of good results. In only 516 out of the 1,230 cases was the length of disability recorded, but it was stated that in *only 13* cases was it more than *24* weeks and *no* case exceeded *36 weeks*.

The above-mentioned Washington insurance report states that of 67 cases of fracture of femur, 53 of which were treated without operation averaged 158½ days of disability and 14 cases treated by operative methods averaged 209 days.

Unsatisfactory and disappointing as these statistics are, how very startling are the following which have been followed up most scientifically by the Austrian government in obedience to the requirements of the insurance societies in 1911. These records are of the greatest value and tell a different and sadder story than that of our incomplete and inaccurate professional records. There were 857 fractures of the femur, of which 153, or 17.8 per cent., recovered with only temporary disability, but the length of this disability is not stated; 683, or 79.7 per cent., suffered some permanent disability; 99 had a loss of 9 to 19 per cent. of their earning power; 120 a loss of 19 to 32 per cent.; 134 a loss of 33 to 48 per cent.; 330 a loss of over 50 per cent.; 38 per cent. of all cases suffered a loss of 50 per cent. earning power.

It is now very evident that it is impossible from all these confusing statements to determine an accurate standard for the duration of disability. We must first accurately record and follow up to the end our own cases to learn the results of our own methods. The more carefully fracture patients are followed up, the more astonished we are to learn how many men are permanently more or less disabled and how rarely ideal functional results are secured. All general hospital records are notoriously inadequate, for the end-results are seldom stated. Patients are discharged as cured when they leave the hospital at the end of eight to ten weeks, although they go away on crutches. True,

the bone has united, but normal function has not been restored—the patient has not yet regained his earning power.

It is gross ignorance of the whole problem of industrial accidents to confuse the surgical and economic results of an injury. From the point of view of an editor, a fractured collar-bone is a minor accident, though it may interfere with a successful game of golf. But to a manual laborer, the collar-bone is the mainstay of his working mechanism upon which a good deal of strain falls, and long after surgical union has taken place, the mechanism remains weak and defective. Among 742 fractures of the collar-bone in Austrian workmen, occurring in five years, 1897-1901, 372, or just 50 per cent., resulted in permanent partial disability, and of these 60 were impaired up to one-half or more of their previous earning capacity.

Hereafter, under the compensation law, it will be necessary to determine the length of the period which elapses between the accident and the date on which the patient is able to resume his customary normal work, and our profession must recognize this as the approximate period required to regain normal function.

The purpose of this paper is to impress upon our profession the urgent necessity of very materially shortening the present period of duration of disability.

Compensation will demand improved standards. The end of the present régime is rapidly arriving, for the radiogram has forced surgeons to appreciate keenly how bad the results are when treated by the average methods.

Wherein lies the inefficiency of these methods?

Recently, in gathering statistics for the Fracture Committee of the American Surgical Association, I tabulated the histories of 340 fractured femurs collected from several different hospitals.

The records indicated that traction was but rarely applied under 12 hours, and, in less than 5 per cent., under 24 hours; furthermore, when applied, the weight was generally insufficient, the amounts being frequently stated as 10, 12, or 15 pounds. When Buck's extension was used, the foot of the bed was occasionally raised, but *seldom* was direct perineal *counter-extension* employed. Reduction under anesthesia is not stated to have been employed in more than 16 per cent. Radiograms showed overlapping and angulation in the largest number of cases.

In this connection it is interesting to note the replies received three years ago from 92 surgeons in Canada and the United States. Sixty-nine thought that 1 inch of shortening was permissible after the fracture of the femur; 19 thought that not more than ¾ inch, and only 4 thought that not more than ½ inch could be permitted. To-day many of the first group have changed their opinions and agree with the last group.

Many of these bad results are avoidable, as they have been due to neglect and lack of efficient treatment, for the patients have been left to the care of junior house officers.

The demand for general operative cases has crowded fracture cases out from the hospital wards. A plaster of paris cast has been applied and the patient has been discharged or transferred to another hospital. At one period, 50 per cent. of the fractured patients admitted to Bellevue Hospital had been transferred from other hospitals.

Great improvement, even 25 per cent., will surely follow if treatment truly intelligent, prompt, and efficient be employed, the most important factor being that it must be efficient *from the very first* and there must be NO delay.

(1) *Reduction* must be thorough, and in the larger number of patients *anesthesia* will be required.

If seen early enough, end-to-end apposition should be secured in many of the transverse and oblique fractures. Formerly it was supposed that spiral fractures of the femur were the most frequent, but analysis of the radiograms of 100 femurs showed 32 spiral, 50 oblique, and 18 transverse.

In this connection I would say that manufacturers are developing a fluoroscopic apparatus which, when perfected, will enable one with a suitable extension apparatus to accurately reduce many of the oblique and transverse fractures.

(2) *Traction.* Immediately after reduction a sufficient amount of traction must be applied and maintained long enough to secure correct fixation of fragments. Generally it is too small and frequently it becomes intermittent and irregular, so that often angulation occurs, even after the first radiogram has shown the fragments in good alignment. The muscles subsequently contract and produce too much movement of the fragment with overriding and shortening.

Traction, to be efficient, must be powerful enough and the force must be applied in the right normal direction to overcome the pull of all the opposing muscles. Shortening is thus obliterated and correct alignment is secured.

The ideal results obtained by Bardenheuer were due to his thorough application of this most important principle in all his practice.

In fractures of the femur, especially of the shaft,

traction that maintains correct alignment will also at the same time secure good anatomical position. This corroborates the findings of the British Fracture Committee—that where the anatomical result is good, then the functional result is good in 90.7 per cent.; but that when the anatomical result is moderate or bad, then a good functional result occurs in only 29.7 per cent. It is therefore of the highest importance that the surgeon secure anatomical reduction.

Bad results are nearly always associated with angulation and are largely due to that cause. This is conclusively demonstrated by the study of any large series of radiograms. Angulation results from ineffectual traction.

In children, traction is much more easily applied and far better maintained; the muscles are less resistant, the weights smaller; the child is lighter and smaller and more easily lifted into correct position by one nurse or attendant house officer, consequently normal alignment is more often maintained. These facts largely explain why the results are far better in children than in adults where traction is far more difficult to maintain.

Under 15 years of age, in 1,016 cases, good functional results were obtained in 90.8 per cent.

Over 15 years of age, in 1,580 cases, good functional results were obtained in only 45.4 per cent.

(3) *Radiograms* must be systematically employed in all cases of fracture of the femur to control the results of reduction. While some may be misleading, yet when made by a qualified operator, they furnish the best records of the relative position of the fragments and they give invaluable assistance in showing how unsatisfactory results may be improved.

Hereafter, in seeking compensation, the patient will surely secure a radiogram, so it is therefore advisable for the surgeon to have previously fortified himself. Courts have generally decided to accept radiograms as evidence. I therefore thoroughly agree with Estes that no physician should undertake the care of a fractured femur unless he can have the benefit of the assistance of a radiogram.

In this connection I believe the time will come when metropolitan hospitals will become so organized that fractures will be assigned to especially equipped wards under the care of surgeons who are particularly interested in the treatment of fractures.

Further, I believe it would be most advisable, both for the future welfare of the patient and also for the economy of employers, that they should require that all fracture cases be sent to hospitals having *x*-ray equipments and extension apparatus and where skilled surgeons should treat them, rather than the company surgeons in their own homes.

(4) *Consolidation.* This period is subject to considerable variation, for the academic period stated in text-books cannot be depended upon, as experience proves that quite a percentage require additional time for complete consolidation.

It therefore happens that when the body weight is carried too early on the recovering femur, bending begins, and if continued, marked angulation and deformity occur.

Again, it is in just these cases that the radiogram is of so great assistance, for it comes to help us before it is too late.

(5) *Operation.* Recently sufficient evidence has been presented to definitely recommend operations by skilled hands for fractures of the femur in the cases where reduction is inadequate. Adequate reduction requires that the ends remain in apposition without obvious angulation or axial rotation, and that the shortening be not greater than ½ inch.

Many surgeons who have had special experience in the treatment of fractures have learned to consider that certain kinds of fractures presenting characteristic radiographic evidence are best treated by operation. In these selected cases after the clinical diagnosis has been confirmed by a radiogram, then the decision is made to operate at once, for here, as elsewhere, operative methods to be successful must be efficient from the first.

"If a surgeon is doubtful whether he can treat a fracture efficiently by a non-operative method, he ought to consider whether he cannot do better by operating at once. He ought not to say, 'We can see what becomes of it and if it is not satisfactory we can operate later,' for by so doing the opportunity of getting a good functional result may be irretrievably lost."

The British Fracture Committee reported that when operation was too long delayed the prospects for good results were sacrificed.

In 147 cases in which primary operation was decided upon, good function was secured in 80 per cent. In 78 cases in which operation was resorted to only secondarily after failure of other treatment, good function was secured in only 60 per cent. In 83 cases in which operation was performed still later on account of malunion, good function followed in only 38 per cent.

The above statistics are corroborated by a series

of 37 cases of fracture of the femur collected by the writer.

In 10 cases of primary operation, good function resulted in 80 per cent.; whereas in 27 cases of secondary operation, good function was secured in only 60 per cent. However, the average of good functional results obtained by these operations was 65 per cent.; much in contrast with the 42 per cent. obtained by non-operative methods in the cases collected by the British Fracture Committee.

As both the American and English series of immediate operation were followed by good functional results in 80 per cent. of the cases, it is quite evident that the present results can certainly be improved from 35 per cent. to 50 per cent.

That delay in operating is very general, even among our own surgeons, is indicated from the fact that among 388 cases of operations collected from members of the American Surgical Association, only 78 cases, or 20 per cent., were operated upon immediately; 310 operations were performed only after other methods had failed.

Of these 388 cases of operations, 143, or 37 per cent., were for fractures of the femur. It is therefore certain that surgeons are favoring more and more operations for fractures of the femur. Results warrant the belief that operations are indicated upon the femur in fractures of the upper and lower thirds when the fragments are much displaced, as they frequently are, and in spiral fractures of the shaft, for it is just this class of cases which uniformly give the poorest results following non-operative treatment.

Finally, in the treatment of fractures of the femur many surgeons are now experiencing similarly unsatisfactory results, as they did fifteen years ago, when they postponed the time for operation in acute appendicitis and in gastric and duodenal ulcers with perforation. The same brilliant results that followed immediate operation in the above cases will likewise follow prompt operation in selected cases of fracture of the femur.

The number of operations will surely increase, but the larger number of fractures will be treated without operation, and the lesson to be constantly taught is *efficiency, efficiency* in every detail *from the hour of the accident.*

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CONCERNING MIXED TUMORS OF THE KIDNEY.

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There is perhaps no more interesting and fruitful field for the study of varied morphological tissue complexes, and for the investigation of the pathogenesis of neoplasms than that afforded by the so-called "mixed tumors" of the kidney. Birch-Hirschfeld was one of the first to call attention to the fact that, in the case of the testicle, the many combinations of mixed connective tissue and epithelial growths should all be thrown into a common group. So, also, was this author sponsor for a similar hypothesis in his classification of the remarkable admixtures of heterogeneous elements encountered in the mixed tumors of the kidney.

Although our knowledge of this subject has been considerably clarified through the work of Wilms and other authors, some of the mooted points in the origin of these tumors still require explanation, and it would seem, therefore, not amiss to report any observations tending to throw light on this interesting subject.

The hypothesis that these growths are the result of the development of rests of the Wolffian body has been suggested by many authors. Were it not for the presence of the striped muscle elements and cartilage as frequent and striking constituents—tissues that could not be derived from the Wolffian body—the theory would have the weight of embryological evidence in its favor. On the other hand, the close proximity of the Wolffian body and the metanephros in the fetus, makes the view of the existence of fusion of the two with inclusion into the kidney of the parts of the former, an enticing explanation.

When we recall that characteristic for the mixed tumors of the kidney is the simultaneous occurrence of two or more varieties of derivatives of the mesoderm, including smooth and striped muscle, cartilage, fat, elastic fibers, myxomatous and fibrous connective tissue—together with the inclusion of certain epithelial elements—and when we remember that many of these are *not* constituents of the Wolffian body, we are forced to seek elsewhere for satisfactory elucidation of the problem of origin.

It is to Wilms that we owe the very plausible theory that all the elements in question owe their derivation to a common *Anlage* which may be assumed to be mesodermal, including cells going into the formation of the mesodermic somites (Myotom), intermediary cell mass (Mittelplatte) and

scleratogenous layer (Sclerotom) of the mesodermal somites.

Let us keep in mind that practically all mixed tumors of the kidney are composed of various elements, amongst which are glandular tissue, smooth and striped muscles, cartilage, fat and elastic, myxomatous and fibrous connective tissue. For the production of such a complex, we must needs look for an embryonal tissue in which resides the potentiality of elaborating all these varied tissue types.

In order that this hypothesis may be clear, let us recall certain elementary, embryological facts in the development of the mesoderm and of the kidney.

For our purpose it will suffice to begin with that stage in which the development of the mesodermic somites and lateral plates occurs. From the mesoderm are formed two thickened bars of mesodermal

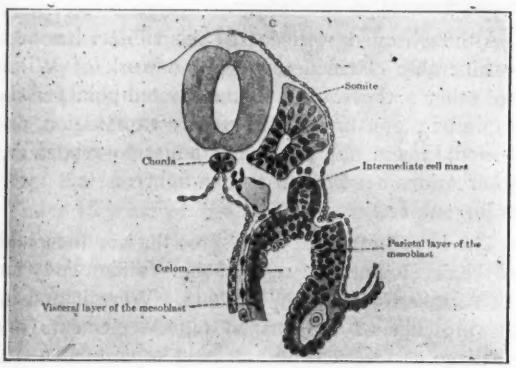

Fig. 1. Transverse section through the tenth pair of somites of the embryo, showing somite and intermediate cell mass (after Kollmann).

tissue, making the paraxial mesoderm, whilst the more laterally situated portions of the mesoderm are known as the lateral plates (Fig. 1). By division of the paraxial mesoderm, a series of cubical masses is produced, termed the *mesodermic somites.* Then a separation of the mesodermic somites and the lateral mesoderm presents itself through the appearance of furrows, the connecting strand of cells being known as the *intermediate cell mass* (Fig. 1).

Each mesodermal somite consists of numerous cells (myotome), arranged around a central cavity which soon disappears. The cells of the somites are gradually arranged into three sets, the *muscle plate* (myotome) (Fig. 2), the *scleratogenous* (sclerotome) layer and the subepithelial or *cutaneous lamella.* The cells of the muscle plate layer lose their epithelial-like character and give rise to the striped muscle of the body. The scleratogenous layer is responsible for many of the skeletal tissues, including, of course, the production of cartilage. The *cutaneous lamella* (mesenchyme) (Fig. 2), contains cells that undergo histological differentiation and are utilized in the formation of the cutaneous tissues, the connective tissues, smooth muscle and bone. From this mesenchyme, according to Hertwig, originates myxomatous, fibrillar, cartilaginous, osseous types of connective tissue, the lymphoid apparatus, smooth muscle and possibly even vessels and blood.

Later in development, we see the intermediate cell mass separated from the mesodermic somites and find it transformed into an elongated body, the primitive kidney (Fig. 2). We know that the Wolffian body, or mesonephros, is developed in this intermediate cell mass by the growth of a number of transversely arranged tubules.

Recapitulating, we note the myotome affording the possibility of origin of *striped muscle* fibers, the

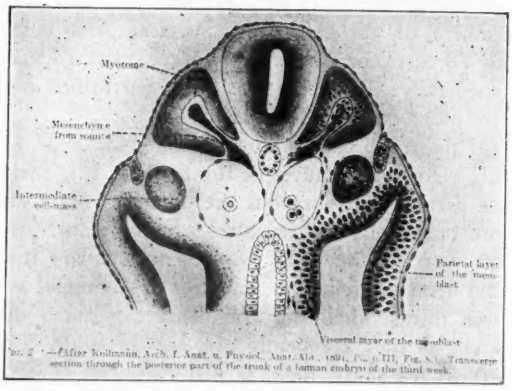

Fig. 2. Transverse section through the human embryo of the third week, showing myotome, mesenchyme, etc.

sclerotome (scleratogenous layer) for *cartilage,* the mesenchyme for the various types of *connective tissue,* including *smooth muscle* and *possibly vessels,* and the intermediate cell mass for the *glandular* or *epithelial* formations.

It would seem most probable that in the intermediary cell mass (Mittelplatte) in the myotome, and in the mesenchyme, all of which are in close proximity and relation in the embryo, must be sought the origin of the mixed tumors of the kidney.

The case to be reported is instructive in that it concerns a renal tumor containing only adipose tissue, fibrillar connective tissue, smooth muscle and vessels, a combination which is unique—as far as we know—and which still further supports Wilm's contention as to the origin of these growths.

In a kidney removed by one of us for calculi and hydronephrotic changes, a small tumor of the cortical substance was accidentally encountered, the gross and microscopic examination of which revealed the following:

Specimen—Kidney from R. S. (referred to Dr. Buerger by Dr. N. E. Brill). is markedly enlarged, almost twice the normal size, showing the usual hydronephrotic changes accompanying multiple branching calculi in the renal pelvis. There is a fairly marked degree of perinephritis with dense adhesions and the peri-pelvic fat is hypertrophied to the extent of the production of a veritable "hilus lipoma" (Fig. 3). Protruding from the convex border near the upper pole is a hemispherical mass covered with capsule, to which it appears to have given a purplish hue. On section, through the center of the growth, a well circumscribed, circular surface, about 14 mm. in diameter, is revealed. When the surface is scraped, a cribriform appearance is produced suggesting cavernous angioma. The mass is soft, can be easily separated from the renal capsule, but is firmly imbedded and adherent to the cortical parenchyma (Fig. 4). Histologically, three different tissues seem to constitute this tumor, adipose tissue, bundles of smooth muscle fibers and vessels. In places the vascular elements seemed to preponderate and the picture is not unlike that of an angioma, containing large thin-walled vascular spaces, intercommunicating, partly separated by connective tissue and smooth muscle fibers, in places showing inclusions of fat. Here and there, the vessels have undergone hyaline degeneration, and at times show considerable thickening of the intima with a tendency to obliteration of their lumina.

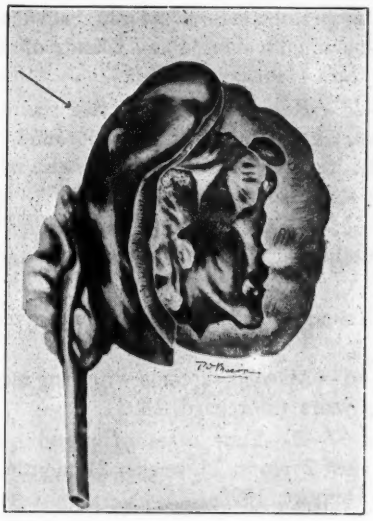

Fig. 3. Hydronephrotic kidney with small tumor on the surface.

As for the smooth muscle tissue, this is either sparsely distributed between the bloodvessels and in the fat, or is collected in bundles of considerable size, which seem to run in various directions, as evidenced by the various pictures afforded by a single section. In the periphery of the growth, where it comes into contact with the renal parenchyma, there are signs of more rapid proliferation of the smooth muscle cells. Here they are not as yet completely developed, being small and apparently undergoing division. The contiguous renal tissue is correspondingly attenuated, being compressed and atrophic. Many of the glomeruli have undergone hyaline degeneration, and the tubules have become distorted and atrophic.

We have here, then, a tumor which is unique in many respects. Its small size, the age of the patient —37 (since children are usually affected)—its lack of gross and histological evidences of malignancy and the character of its constituent elements, at once set it apart from the most of the mixed tumors of the kidney, previously reported. It is particularly interesting to note that only such tissues are included as could be derived from the mesenchyme, *the intermediate mass or Wolffian body being not at all represented.* This circumstance speaks, we think, in favor of the correctness of the assumption that the mesodermal somites, with possibly the intermediate cell mass, is responsible for the origin of the mixed tumor, the theory that rests of the Wolffian body are wholly engaged being untenable.

Fig. 4. Photomicrograph of the mixed tumor; above, vessels, smooth muscle, fat; in the middle, vascular spaces; below, fat.

For those interested in a recapitulation of the more important examples of mixed tumors of the kidney reported in the literature, the following summary of 40 cases may be of interest.

I. So-called adenosarcomata with epithelial elements, with or without muscle and cartilage.

Case 1.—Adenochondrosarcoma (Perthes, 1896).

Case 2.—Adenosarcoma (Volger, 1897).

Cases 3, 4, 5.—Adenosarcoma with myxomatous stroma; patient's age 4½ years. Round celled adenosarcoma; age 3 years. Round called adenosarcoma; age 3 years (Heineke, 1897).

Cases 6, 7.—Adenosarcoma containing fat, car-

tilage, elastic and fibrous tissue; age 11 years. Adenosarcoma with striped muscle, rich in glycogen; age 1 year (Wilms).

Case 8.—Adenomatous tumor, consisting of alveoli lined with cylindrical epithelium in a fine stroma of spindle cells; age 7 years (Döderlein, 1897).

Case 9.—Adenosarcoma, composed chiefly of round cells, but containing also spindle and epithelial cells, elastic fibers and smooth muscle; age 2½ years (Paul, 1886).

Case 10.—Vascular, round and spindle, celled sarcoma, containing epithelial lined tubules; age 9 months (Sturm, 1875).

Case 11.—Round and spindle celled sarcoma with adenomatous formations; age 8 years (Schmidt, 1892).

II. Myosarcomata with or without fat and striped muscle.

Case 12.—Bilateral myosarcoma, composed chiefly of bundles of striped muscle in a connective tissue framework, containing blood vessels and fat cells; age 1½ years (Cohnheim, 1875).

Case 13.—Bilateral myosarcoma; age 7 months (Cohnheim and Landsberger, 1877).

Cases 14, 15.—Rhabdomyosarcoma; age 2½ years. Myosarcoma; age 2¾ years (Heineke, 1897).

Case 16.—Myosarcoma, composed of striated muscle and a mixture of spindle and round cells; age 7 years (Bott, 1887).

Case 17.—Myosarcoma with embryonic striated muscle; age 1½ years (Heideman, 1893).

III. Round and spindle celled sarcomata, with or without striped muscle.

Case 18.—Spindle celled sarcoma containing striped muscle fibers; age 1 year (Eberth, 1872).

Case 19.—Small round celled sarcoma with considerable striped muscle, some fat cells and epithelial formations; age 6 months (Marchand).

Cases 20, 21.—Two cases of round celled sarcoma with striped muscle; age 19 months and 3½ years (Osler).

Case 22.—Polypoid spindle celled sarcoma with considerable quantity of striped muscle fibers and epithelial cells; age 4 years (Ribbert, 1886).

Case 23—Round and spindle celled sarcoma in a myxomatous stroma, which had the chemical properties of mucin; age 2 years (Hanseman, 1894).

IV. Rhabdomyomata.

Case 24.—Rhabdomyoma; age 3¼ years (Hüber-Boström, 1879).

Cases 25-28.—Four cases of rhabdomyoma (Ribbert, 1892).

V. Teratomata and tumors containing adenomatous tissue, spindle cells, muscle and cartilage.

Case 29.—Teratoma composed of sarcoma cells, chiefly giant variety, striped muscle, layers of glycogen, small islands of cartilage and glandular structures (Manasse, 1896).

Case 30.—Embryonic connective tissue, striped muscle fibers without sarcolemma and adenomatous formations, which resembled most the collecting tubules of the kidney; age 3 years (Kocher, 1878).

Cases 31, 32.—Tumor composed of glandular epithelium, smooth and striated muscle, fibrous and elastic tissue; age 6 years. Tumor composed of fibrous and connective tissue, smooth and striped muscle, elastic tissue and cartilage (Wilms).

Case 33.—Round and spindle celled sarcoma, containing smooth muscle and islands of cartilage; age 18 years (Hoisholt, 1891).

Case 34.—Network of connective tissue, muscle and elastic fibers filled with small round, cuboidal and cylindrical cells. Fat cells present in isolated groups; age 3 years (Brosin, 1884).

Case 35.—Glands, smooth and striped muscle, elastic tissue, fat and connective tissue; age 3 years (Wilms).

VI. Round and spindle celled, and alveolar sarcomata.

Case 36.—Alveolar sarcoma with lung metastases; age 2½ years (Borchard, 1893).

Cases 37-40.—Four cases of round celled sarcoma; ages 2 years, 11 weeks, 21 months, and 11 years (Heineke, 1897).

Tendon Transplantation.

Very ingenious methods have been devised for the attachment of tendons into the periosteum, as in boring a hole through the neck of the bone, as practiced by Jones; or by the employment of iron staples and wire, as advised by Codivilla. A great variety of arrangement may be used in transplanting the tendons. The peroneals may be transplanted to the inner side of the foot; the tibialis anticus may be transplanted to the outside of the foot; the tendo Achilles may be shortened, and the peroneal tendon or a part of the tibialis posticus may be transplanted into the tendon before it is sutured together. The external hallucis may be detached from its insertion and inserted into the neck of the first metatarsal bone, through a hole drilled in it. The semitendinosis in the thigh and the biceps, or the sartorious and the biceps, may be transplanted into the rectus tendon, or by the use of silk attached to the tubercle of the tibia.—James K. Young in *The Lancet-Clinic.*

SOME OF THE DEFORMITIES FOLLOWING INFANTILE PARALYSIS, WITH ESPECIAL REFERENCE TO TREATMENT.

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The statement accredited to one of the most prominent members of the medical profession in America, that "no treatment is available at the present time for anterior poliomyelitis," has been productive of considerable harm, inasmuch as it has in many instances been the means of preventing the opportunity of instituting the necessary treatment to overcome some of the most common resulting deformities. Although it may be true that no remedy has yet been discovered by the administration of which inflammation of the cord may be arrested and paralysis prevented, this should not be permitted to interfere with treatment and correction of the deformity provided paralysis has already supervened when the patient comes under the observation of the surgeon. In other words, while it may be impossible to prevent deformity by arresting the disease before paralysis has ensued, the fact remains that much can be later accomplished in the way of overcoming the deformity and restoring the function of the paralyzed muscles. It is believed that "far too little surgery is generally done in cases of infantile paralysis, and that nearly all cases can be benefited by properly planned and properly executed operations" (Ryerson).

Therefore, the "human wreckage" caused by anterior poliomyelitis is worthy of the most serious consideration of the surgeon, and the fact that no one appears able to really cure the original disease is no reason for not attempting to make useful, self-supporting individuals out of those who would otherwise be helpless, hopeless cripples—a burden to themselves and the community.

One of the most common deformities following infantile paralysis consists in either partial or complete inability of the patient to control the lower extremities. Whenever paralysis of the quadriceps ensues, of course extension of the leg is rendered impracticable. By transplantation of the biceps femoris tendon into the patella it has been possible to successfully overcome this deformity. In performing the operation great care should be exercised to thoroughly isolate and protect the external popliteal nerve, which on several occasions has been accidentally divided, resulting in paralysis of the peroneal muscles.

In the performance of this operation the biceps tendon is loosened from its tibial attachment and inserted into the top of the patella; with the foot everted the fascia lata is longitudinally slit and carefully sutured with silk behind the great trochanter. Arthrodesis of the ankle joint is usually necessary to overcome the "flail-foot." Proper braces should be worn until the wounds have healed.

Instead of producing arthrodesis of the ankle joint the following procedure has been recommended: The anterior tendons are carefully separated from the muscles high upon the leg; a hole is drilled through the tibia, the tendon ends being drawn through this and fastened in front of the tibia—some of the tendons being passed through from one side, and others from the other side. The tendons are thus shortened, leaving tendinous structures between attachment and insertion; the tendon thus acts as a ligament, and little or no stretching occurs. If the posterior tendons be also shortened in similar manner, the necessity of arthrodesis is avoided.

After transplanting the biceps tendon as outlined, some surgeons advocate "double fixation" of the ankle joint by means of nails or screws. With the foot in proper position one screw is passed through the external malleolus, astragalus, and calcaneus; the second through the internal malleolus almost at right angles with the first; the third through the scaphoid and cuboid thus "fixing the key of the arch of the foot."

Tendon transplantation was first performed by Nicoladoni, in 1882, for the relief of paralytic calcaneus. Since then Parish, Drobrink, Goldthwaite, Gibney, Whitman, and a host of other prominent surgeons have obtained excellent results from the operation. However, tendon transplantation is indicated only after the final degree of paralysis has been definitely determined, using only such tendons and muscles as have sufficient strength, or it seems reasonably certain can be gradually developed, to do the required work.

Briefly, the essential points as to technic of tendon transplantation and after-care of the patient are as follows:

(1) The surgeon should always strive for perfection in asepsis.

(2) When the tendon is of sufficient length it should be passed through a hole drilled in the bone; if not long enough, include the periosteum when detaching the tendon from its original insertion.

(3) The results are most favorable when the tendon is transferred through the bone.

(4) The next best plan is to transfer a small

piece of bony attachment to the new point of insertion.

(5) The results of one tendon transferred to another are less favorable as there is too great likelihood of stretching.

(6) The tendon should be dissected free for a considerable distance that its new course may begin as high as possible, and thus avoid working at an acute angle, that is its action must be made as nearly normal as possible.

(7) Silk seems to be the suture material of choice, although in many instances an absorbable suture is believed preferable.

(8) The member operated upon should be placed at rest in a slightly over-corrected position for at least six weeks, to prevent strain until the union is firm.

(9) Care in the practice of active motion should be then exercised and a convalescent splint be worn until muscular development in the new position becomes sufficient.

(10) In addition to tendon transplantation the production of arthrodesis is frequently of great assistance, thus partially stiffening the adjacent lax and insecure ankle joint.

In certain instances to overcome the deformity described as "drop-foot," silk ligament suspension instead of tendon transplantation may be advantageously employed. This method of treatment has been rather extensively used by Bradford, Ryerson, and others. The foot is suspended by heavy braided silk cords subcutaneously applied, extending from the tibia downward in front of the ankle to the bones of the foot. The operation is comparatively simple, but the technic must necessarily vary in each case according to the degree of deformity present. The silk is allowed to remain permanently in the tissues, and if the operation has been properly executed a favorable result may be confidently expected to accrue. It is always advisable to close the operative wound in two layers, i.e., suturing the subcutaneous soft tissues over the silk cords separately. A plaster dressing should be applied and permitted to remain for at least six weeks, after which no further external support will usually be required.

Talipes calcaneus, caused by paralysis of the calf muscles, is a disabling deformity which in the majority of instances may be corrected and a useful foot secured by an operation recommended by Whitman, *et al.*, a procedure which has given such universal satisfaction that it is adapted as a routine measure in all such cases, viz., astragalectomy, with posterior displacement of the foot at about five degree equinus. The peroneus longus tendon is divided about three inches from its insertion and dove-tailed through the tendo achilles, the ends being carefully sutured, thus reinforcing the foot in its backward position. A strong and serviceable foot which continues to develop may be thus secured.

Another deformity of frequent occurrence is paralytic equinovarus. If paralysis is too extensive to be benefited by transplantation, tendon fixation may be practiced as recommended by Gallie, of Toronto, the following technic being employed: A longitudinal three-inch incision is made over the external malleolus; the peroneal tendons are exposed and lifted from their sheaths; a two and a half inch periosteal incision is then made and the periosteum retracted; the bone is removed for the same length as the periosteal incision and the thickness of the tendon to be transplanted; the tendons are drawn taut and placed in this trough, the periosteum being carefully sutured over and to them. For this purpose chromic catgut is used. The tendons become firmly adherent and calcaneus is thus prevented. The patient is able to bear the body weight upon the ball of the foot, raising the heel from the ground, thus greatly improving the gait. The first operation of this character was performed about two years ago. Gallie reports 10 cases, the patients ranging in age from 2 to thirty years. The results obtained have been entirely satisfactory. Many other surgeons have reported favorable results from the Gallie operation.

For the correction of the deformity known as "clawfoot," which is usually the result of infantile paralysis, transplantation of the extensor proprius pollicis to the neck of the first matatarsal bone may be successfully practiced. In this deformity there is not only a marked shortening of the extensors but also the plantar fascia. After subcutaneous plantar fasciotomy a horseshoe incision of the dorsal foot surface is carried to the extensor tendon, and a flap containing all the tissues superficial to this is reflected upon the dorsal surface of the tarso-metatarsal articulation. The long extensor tendon is then detached from its phalange and transplanted into the neck of the metatarsal bone. In aggravated cases, if the deformity be not thus corrected, a wedge-shaped osteotomy through the dorsal surface of the metatarsal bone is recommended.

To illustrate the serious results which may accrue from clawfoot, the history of one case will be briefly related. The patient was a male of 35 years, the deformity having developed 12 years previously as a result of infantile paralysis. No treatment was instituted until he became unable to walk, and there was then extensive bony necrosis originating

in the first metatarsal joint caused by pressure. The man was exceedingly heavy, and practically all of his weight was thrown upon that portion of his foot. Necrosis rapidly developed, and the extensive burrowing of pus had caused such destruction of bony and soft tissues that amputation of the foot became necessary as a life-saving measure. Had this patient been seen early and treated according to the method just outlined, amputation could have been avoided and a serviceable foot preserved.

In conclusion: Under no circumstances should a patient with infantile paralysis be permitted to go untreated, as prevention of deformity is far more important than allowing it to progress, and then by radical means expected to later correct it. For instance, if a child with paralysis of the peroneal muscles—the internal group being normal—is allowed to go without protection or support, the healthy internal muscles rapidly develop and contract, thus forcing the foot into a varus position because there is no resistance from the paralyzed external muscles. The smaller bones of the ankle and foot develop in an abnormal attitude, thereby markedly changing the normal osseous relationship. If the limb is properly supported, deformity is prevented from progressing, and even if later it becomes necessary (which it most likely will) to practice tendon transplantation, the bones are normal in both size and relationship. It is then only a question of the proper support being transferred from braces to healthy transplanted muscles, or power restored by whatever other operation may be selected as most suitable.

It seems necessary to reiterate one important fact which is sometimes overlooked, viz., that completely paralyzed muscles from infantile paralysis always remain so. Partially affected muscles, however, can be developed greatly by scientific active motion personally supervised by one who is thoroughly familiar with the conditions. When the parents are advised to "simply let the child run for a while and develop the paralyzed muscles," it means that those completely paralyzed are not benefited, and those partially affected may be overtaxed, thereby losing much strength which could have been retained and developed.

Nerve grafting has hitherto not proven satisfactory, although in the future much may be accomplished in this direction.

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THE TREATMENT OF PUERPERAL SEPSIS.*

"AN OUNCE OF PREVENTION IS BETTER THAN A POUND OF CURE."

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Puerperal infection is the general term applied to all infective conditions which arise from the entrance of organisms into wounds of the generative tract in connection with labor or the puerperium. It is essentially wound infection and is strictly comparable to "surgical wound fever."

I am not going to discuss all the methods of treatment nor the treatment of all the types of puerperal sepsis. I shall exclude from consideration such conditions as pus tubes, appendicitis, erysipelas, diphtheria, scarlet fever, gonorrhea, and those cases in which there has been a pre-existing focus of infection, which frequently complicate pregnancy. I shall consider only that condition arising from wound infection. I refer especially to the puerperal sepsis seen in the regular grind of general practice, and appearing after what has seemed to have been an ordinary normal labor—that which, by the laity, is called "child-bed fever." There are many good methods of treatment, but that which will be detailed by me, is the one which has been most effectual in my practice. I assure you that it is not all original, but has been gleaned from the experiences of the leading obstetricians of the various American and European clinics.

For the sake of study, the treatment of puerperal sepsis may be divided into: 1, prophylactic, and 2, curative.

The Prophylactic Method. In the first place we should have the parturient patient located in as hygienic and salubrious a place as possible for the confinement. It is self-evident that we cannot expect to conduct an aseptic surgical operation amid septic surroundings.

The best place for such a responsible undertaking is in a well equipped hospital with trained nurses and plenty of help, but the hard working country doctor has no such advantage at hand and must make the best of such conveniences as he can command. The city doctor has every advantage and is therefore doubly culpable if he fails to avail himself of these helps to asceptic midwifery.

The patient should be confined in a well-ventilated room. There should be plenty of fresh air. Fresh air does not mean cold air. There may be a

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brisk fire burning in the room, and even though the windows be open, the air will be warm. No home is too poor to be clean and no window too small to admit fresh air, if it be opened. I have often been called in council and found the patient still dressed in reeking underwear and at times a skirt in addition.

The vulva should be cleaned with soap and water and may be painted with tincture of iodine. It is a good procedure to shave the vulva. If a bath is given, the nurse must be careful not to allow the dirty water to run over the vulva into the vagina. Zweifel reports several cases of infection from this source.

The patient should be covered with a sterile, or at least clean, sheet; and not with a soiled blanket or comfort.

Sterile supplies, such as dressings, towels, gloves, sheets, catheters, tape, etc., are not difficult to obtain. In the city they can be obtained at a nominal cost from any good hospital; in the country every up-to-date physician has a sterilizer in his office and can sterilize his supplies with little effort. To go to a labor case without such preparation in view of the cost and ease of obtaining the same, is little short of criminal. And then the people appreciate it and are willing to pay for it. Some men will say that they do not do this and that they never had a case of puerperal sepsis. They are liars. Others will say that they never had a death from puerperal sepsis. There are some things that are worse than death. How about the morbidity? How about the one child marriages, the pus tubes, the pelvic inflammations and adhesions? How about the years of weary suffering and disappointment? Between morbidity and mortality there is little to choose in these cases.

We cannot have graduated trained nurses in all cases, but we certainly can teach the slovenly "experienced nurse" to wash her hands and be clean. Of course, we must cast the mote from our own eyes before we can ask her to remove the beam from hers. These nurses may object to this instruction, but if we explain to them how much *they* gain by it, they will appreciate our efforts. And how easy it is to teach the good sister or mother or friend of the patient to do all these things in a cleanly manner. But you must show them that *you* know what you are talking about or they will not appreciate the value of the efforts demanded.

In lecturing to the nurses at the Grant Hospital I have always impressed upon them that the most important article of an obstetrician's armamentarium is a good brush and a bar of soap. The brush need not be fancy and the soap need not be patented or perfumed. A common rice straw brush and a bar of common soap will suffice. *The main prerequisite for the prevention of puerperal sepsis is clean hands.*

You should wear rubber gloves when handling the parturient woman. It is just as important at this time as it is in the operating room. It is malpractice, in these days of refinement, to attend labor without rubber gloves. Some will laugh at this statement and say they cannot feel anything with gloves. They must learn to feel with gloves. Perhaps you can conduct an aseptic labor without gloves, but why not use every aid to attain that object? Why refuse any single aid or modern refinement where so much is at stake? We know that God is patient and good, but why should you try His patience and risk your reputation and the life of a good woman who has placed her trust in you? The young fellow just from college will use them and the people will notice it. It is important that the hands be clean before applying the gloves and it is important that the gloves be kept clean after they are on the hands. It is ridiculous to see a doctor putting clean gloves upon dirty hands. Suppose the glove tears. It is just as foolish to immerse a dirty glove into a solution of bichloride of mercury and imagine it is sterile. A soiled glove must be cleansed with the same care as a soiled hand. And the same applies to the catheter. You do yourself an injustice when you use any old rag for a perineal pad to absorb the lochial discharge. A most useful bed covering for labor is the paper sheet sold by all dealers of physicians' supplies.

The use of sera to immunize against infection does no good. We must follow the principles of Crede and limit as far as possible the puerperal wounds and prevent the infection of necessary puerperal wounds. Every puerpera is a wounded woman. If it is good surgery to limit the operative wound and to avoid the injuring of the tissues, it is also good obstetrics. We must limit the number of internal examinations and make them gently and in a cleanly manner. It is important that all obstetricians learn to make diagnosis by external examination. About the only points indeterminable by external examination are the state of the cervix and the possible prolapse of the cord. The bag of waters should not be ruptured until the os is completely dilated, because the membranes dilate the cervix with the least trauma and also mechanically prevent the entrance of germs into the uterus. You must avoid all measures to shorten the time of

normal labor, as manual dilitation of the cervix, of the perineum, or having the woman bear down before the head is through the cervix. Do not give ergot until the placenta is delivered. Do not apply forceps until there is an honest scientific indication for their use. Pituitrin, scientifically used, is replacing forceps, and in Vienna they think that the use of this agent instead of forceps is reducing the morbidity and mortality of their clinics. Do not use douches, especially hot ones or antiseptic ones, in normal labor. They rob the vagina and the cervix of their epithelium and natural secretions. Prevent perineal and vaginal tears as far as possible, which means a patient conduct of the second stage;; but do not allow the other extreme, or practice, and permit the head to pound for hours upon a rigid perineum until the vitality of the tissues is lost and they are bruised and infiltrated with blood. Early episiotomy and forceps are more scientific procedures.

The third stage should be conducted as physiologically as possible. Interference should be instituted only upon strict indication. Above all, do not attempt manual removal of the placenta unless there is profuse hemorrhage or it is pathologically adherent. Be very careful to obtain the placenta and membranes complete. Retained placenta makes splendid soil for the cultivation and growth of the vaginal bacteria and also prevent involution, which is itself a barrier to infection. The uterus should not be bruised by too early or too vigorous attempts at Crede expression of the placenta, or too much or too forcible massage of the uterus. In Vienna they never express the placenta unless there is bleeding; they leave it alone and allow it to come of its own accord. They say that this has helped to reduce the morbidity in that clinic. The placenta and membranes should be inspected to see that none is left in the uterus. It is the keystone of the treatment of the patient should fever arise subsequently. If a piece is missing it should be removed at the time of labor. If it is a large piece, it is not necessary to go in for it. You must see that the uterus is free from blood clots, hard and firmly contracted, before you leave the house. I find that allowing the woman to get out of bed to the commode the next day after delivery allows blood clots to drop from the vagina and also acts as a drain, thereby preventing, to some extent, infection.

Prevention of infection of the unavoidable wounds comprises the principles and practice of asepsis and antisepsis and should consist of a technic most rigid in character and should be part of the very body and soul of the accoucheur.

I have not gone into the preparation and care of the patients before labor begins. I am taking it for granted that the cases with which we are to deal were perfectly normal when labor commenced.

If you have carried out the above program you should not have an infected case. If you do have the misfortune to have your patient infected, you must resort to the curative method.

The Curative Method is divided into: 1, local; 2, general; 3, specific; 4, surgical.

We are seldom able, at least in our own minds, to designate the original or specific focus from which the infection emanates. We must investigate the history of the labor, paying especial attention to the frequency of examination by vagina, the use of instruments or manipulation, the character of the third stage and the existence of lacerations. The temperature and the pulse must be studied. Very careful examination of the breasts, abdomen, and pelvis must be made and the relation of the condition of the alimentary tract to the general condition ascertained.

The treatment of puerperal sepsis has undergone many changes in recent years. The polyglot treatment of former years has given way to a more physiologic treatment; and we now rely more on aiding and stimulating nature's own methods of combating the disease. Nature has always been the best doctor for most diseases. When the general medical examination has excluded all other causes for illness and a diagnosis of puerperal sepsis has been made, the woman is isolated in the lightest, airiest room available, and put at complete mental rest, which means that a clean, pleasant, sensible obstetrical nurse is put in charge of her. A brisk cathartic is administered (calomel followed by salts or castor oil) and the patient put upon a generous semi-solid or fluid diet. If there be stitches in the cervix or perineum, they are removed at once to allow free drainage. The gaping wounds and the vagina are swabbed with pure tincture of iodine. Developments are then awaited. It seems to be a general custom to give quinine at this stage of the disease, but I do not know why. I never saw it do one bit of good and I do not see why it should.

Many teachers, including DeLee and Ries and others, are strongly opposed to manipulating the uterus even if they are sure that there is something remaining in it. McPherson and others are just as strongly in favor of emptying the uterus if there is anything in it. I agree with both of them. We must approach this matter in the manner of the student who was told by his teacher how to mix paints. We must do it with our brains. We must

pay special attention to these matters and learn by experience and then we will have the requisite brains to form our judgment. DeLee and Merman report large numbers of cases treated by what they call a nihilistic or expectant treatment with wonderful results. I have seen many cases where severe illness was caused by active local treatment and in some cases death was caused by curettage, pelvic drainage, etc., intended for relief. The patient may be propped up in Fowler's position to aid drainage, but curettage, brushing out the uterus, packing, etc., are seldom employed by us at Grant Hospital. About the only indications for such treatment is hemorrhage from the uterus. If the woman does not show immediate improvement then we go further with our treatment.

The local treatment of infection is the attempt to remove the offending bacteria and their toxins, and their pabulum, clots, membranes, placental fragments, decidua—and to destroy those bacteria and neutralize those toxins which remain in the vaginal canal after the mechanical cleansing.

The idea is an excellent one, but this is a very dangerous procedure, even in the hands of an experienced obstetrician or surgeon. Under this head I wish to most strenuously decry the use of intrauterine douches. They are most ineffectual because the bacteria are beyond reach fifteen minutes after they are inoculated. They are painful, sometimes violent uterine contractions being set up, and the fluid may escape through the tubes into the peritoneal cavity and a fatal peritonitis may occur. That the fluid can be forced through the tubes was amply proven some years ago in the service of Dr. J. F. Baldwin at the Grant Hospital. Some of you will say that they can be given carefully; that the douche bag should not be held too high; that you have often used these douches and have seen no harm. Who can tell the exact resistance of the tubes and the uterine walls in each and every case? Who can be sure that you or the nurse will hold the douche bag at the exact and proper height each time? If the greatest surgeons in the world are never sure of the consistency and resistance of the uterine wall, why should you tempt fate with such a dangerous procedure? You say you never had an accident; if you mean a death I may agree with you; but how about the morbid condition produced by your douches?

The nervous shock from these douches may cause syncope, convulsions, and even coma. The antiseptic may be directly poisonous, over fifty cases of bichloride and many cases of carbolic poisoning being on record. Air embolism, perforation of the uterus, profuse hemorrhage, chills and fever from inoculation, sudden death from cardiac paralysis may result. The infection may be carried higher to uninfected parts. This protest against the intrauterine douche must not be construed as inveighing against vaginal douches, as I believe in them *when specifically indicated.* Swabbing out the uterus with gauze wound around forceps and saturated with chemicals, or brushing the uterus, is deprecated by me.

Curettage or digital examination and removal of the uterine contents is recommended by many authorities here and abroad, among whom may be mentioned Williams, Hirst, Gallabin, Jellett, Sinclair, Chrobak, Schauta, Ahlfeld, Bar Pinard and Pestalozza. I use this method at times when I think it is indicated. You must be careful or you will do more harm than good.

Curettage was introduced in 1850 by Recamier, who invented the curet for this purpose. Some operators use a sharp and others a blunt curet. Some use it as a routine practice as soon as the fever disappears; others use it only if the finger fails to remove the particles from the uterus. Some repeat the operation once or oftener and some pack the uterus at the end of the operation. The principle exponent of this operation is McPherson of New York. Opposed to him are Williams, DeLee, Noble, Craigin, Edgar, Watkins, Ries, Bumm, Leopold, Fehling, Kronig, Veit, Ohlshausen, and others who formerly advised the operation.

I think that the curet is a very dangerous weapon at all times and especially at the puerperium. As I said before, it is an instrument that must be used with brains. I rarely curet in these cases of infection, but when I do, I assure you that I feel the great responsibility and danger of this operation more than when I operate upon a patient for any other condition. I do not believe, as do some of my more noted colleagues, that curettage is an operation to be performed by the general practitioner, especially in cases of puerperal sepsis. The delicate bank of leukocytes, the wall that nature throws up to limit the spread of the bacteria, is broken through, and the bacteria are literally ground into the lymph spaces and venous lumina. It is a thorough vaccination of the uterine tissues and resembles raking the soil after strewing it with seed. No matter how expertly done, curettage cannot remove all the diseased tissue. Perforation of the uterus is a common occurrence and causes fatal peritonitis. I have several times seen loops of bowel dragged down into the vagina. Hemorrhage may occur and cases of air embolism have been

reported. A pyosalpinx or other pus sac may be opened by this manipulation. It makes no difference how carefully the operation is performed, there is always danger of perforation. DeLee says that it is about as reasonable to curet the nose and throat in cases of diphtheria as to curet a uterus for puerperal sepsis.

Emptying the uterus with polypus forceps is also a dangerous operation on account of the danger of perforation and also mutilation of the uterine wall. I use this instrument a very great deal, but I fully appreciate the great delicacy of touch and care necessary to avoid accidents.

Drainage of the uterus with glass or rubber tubes is advised by some French, Italian, and American obstetricians, but I do not think much of this procedure. In my opinion, packing the uterus with gauze stops drainage and presents the same dangers noted above for the other procedures. Nature often does wonders. Winter, Saft, Merman, Bumm, Watkins, DeLee, Ries and Crédé strongly emphasize the dangers of local treatment and one voice after another is being raised against intrauterine douches, curettage, and other local interferences with the process of healing adopted by nature. I hope that I have impressed you with the danger of the use of the curet in these cases and that you will be slow to resort to its use in the future. It is a good instrument in skilled hands when indicated.

General treatment includes everything that will improve the woman's general health and help her to throw off the disease, and the attending physician should count no effort lost that will increase her resisting powers. If mental and physical rest do not procure sleep, morphine should be given. Sleep is a prime necessity. Visitors must be excluded from the room and everyone about the house should bear a cheerful mien. Nursing of the child should be stopped because it worries the mother and the child may become infected.

For the *fever,* as a rule, nothing need be done. Antipyretics are especially contraindicated and the heart should not be tired by too much moving of the patient. As in Vienna, aspirin may be given to reduce the temperature by combating the poison and eliminating the toxins. Aspirin is a splendid diaphoretic. I have had a patient get well after carrying a temperature of 105° for three weeks. Another recovered after having a temperature of 103° to 105° for five weeks. In these cases nothing was done for the temperature. Drugging is to be avoided, as far as possible, because it does little good and because it upsets the stomach, the most important ally of defense. Alcohol is not used as much as formerly, and I am sure that it never did as much good as was supposed. I seldom use it at all. If alcohol is used, one-half ounce a day in the form of eggnog or wine is sufficient.

The *bowels* should be kept open with an occasional laxative. Diarrhea is one of nature's best drains and should not be interfered with unless the patient is exhausted. Opium and starch enemata are good to relieve the diarrhea. Vomiting is always a bad symptom, and if bilious always means a fatal ending of the disease. Food by the mouth is withheld for a while and rectal feeding instituted. Saline drop enemata will serve to quench the thirst. Or if vomiting persists the stomach may be washed out. I have had excellent results with this method. It is surprising how much greenish-black fluid is removed and the patient feels relieved for several hours. Drop doses of wine of ipecac has been tried by me with good results. Later, against peritonitic vomiting we stand powerless and dismayed. Many surgical methods of feeding have been tried, but the women always die, not from starvation but from toxemia.

Meteorism or gas pains in peritonitis is a troublesome condition. Overfeeding and cathartics are to be avoided and enemas given. We are in the habit of giving the old fashioned S. G. T. enema, composed of salts, glycerine and turpentine for this condition. DeLee recommends an enema composed of one pint each of milk and molasses.

For *chills* the patient is covered warmly and given warm drinks. If the chill is prolonged, one-sixth of a grain of morphine may be given hypodermatically.

Attention is given the heart and exertion of the patient is avoided in order to save the strength. Cardiac stimulants are to be avoided until they are absolutely needed. Many patients have been "strychniaized" to death. Fresh air and oxygen are recommended as the best aid for syncope. I can testify to the efficiency of fresh air, but I am forced to admit that I have never seen oxygen do one bit of good in these cases. We always use it because the laity expect us to do so, but I am sure that it is a waste of time and money.

Special attention must be paid to the diet and little fats given. Milk, especially buttermilk, may be given. Kumiss, eggs, jellies, cereals, sugar, ice cream, and gelatin in all forms are permissible.

The mental state of the patient must be treated. She must be buoyed up with the hope and assurance that she will recover. You will be surprised how much can be accomplished by this.

Specific Treatment. Most of the remedies used

in the past for the specific treatment of puerperal sepsis have failed. Under this head may be listed the silver preparations of Crédé, the mercury inunctions, and injection, the use of iodine, quinine and alcohol given intravenously and subcutaneously. Salt solution is a remedy that has been much lauded in the past for the treatment of all forms of infection. It is valuable but is far from being a panacea. The best method of administration is the drop method of Murphy. Care must be used in the intravenous use of salt solution; there is not only danger of air embolism but there is danger of overloading the circulation, causing pulmonary edema. It does not wash the toxins from the blood, as they are so bound onto the cells that only biochemic action can loosen them. The good effects of salt solution, when carefully and skilfully given are, that it stimulates the heart and kidneys, skin and intestines, relieving thirst and fatigue and promoting leukocytosis. Schauta of Vienna reports some success with the use of nuclein, but the results are not yet such as to justify its general use.

I have seen a number of cases treated with serum without any effect either for better or for worse. We might just as well have injected water and saved a whole lot of money. DeLee, in his large experience, has used all kinds of sera for 16 years, and says that he is positve that anti-streptococci serum does not cure a single case of streptococcic sepsis. Williams, Pryor, and Fry confirm these findings. Large numbers of cases have been treated by Bumm, Chrobak, Gordon and others and the reports are far from encouraging. In Vienna the use of sera has been abandoned and also in Munich. Our experience at the Grant Hospital has taught us that their use is absolutely futile. Tetanus serum has been found useful when indicated but the anti-streptococcic serum is useless. The reason for this is obvious to those who are working along the lines of immunity and hence I will not take the time to discuss it here.

DeLee, Williams, Cragin and Newell have found the results of vaccine therapy in puerperal infections to be negative. I do not feel that there is at present much to be gained by the use of vaccines in this condition. I think that we had one case in our hospital where vaccines were used with apparent good result. But our experience is too limited to speak with any degree of authority. Dr. Shilling is constantly working on this subject in our laboratories, and may report something of interest later. It is generally admitted that in acute puerperal sepsis vaccine therapy is useless and may be harmful. The abscess of fixation, once in a while heard of, has been lost in the march of progress.

Surgical Treatment. Little need be said about the surgical treatment of puerperal sepsis other than has already been discussed in the preceding chapters of this paper. The treatment of pelvic inflammations by operation in this condition is no different than in any other. No real difference of opinion exists regarding the procedures advocated for the treatment of localized suppurations. Two radical operations have been employed in the treatment of severe infections and there is much to learn about both of these. One is extirpation of the uterus and the other is ligation of the pelvic veins, with the view of stopping the progress of a thrombophlebitis. Total hysterectomy has been done several hundred times, but without enough success to give it a firm place in our therapy. Most of the authorities whom I have consulted admit the following indications for hysterectomy. In all of these the local lesion is the predominate factor. They are rupture of the uterus or vagina with infection, perforation of the uterus with peritonitis, or perforation of the uterus during local treatment of an infection within it; the infection of a fibroid, or when a fibroid has been much bruised by an operative delivery and infection is feared; cancer of the uterus (I saw one such case in a woman who was six months pregnant); infection with molar pregnancy; abnormal adherence of the placenta with infection; uterine abscess; gangrene of the uterus.

The greatest danger is from peritonitis due to soiling the peritoneum during removal of the uterus. Much uncertainty exists as to the propriety of removing the uterus in cases of bacteremia, or at least in cases of severe endometritis and uterine lymphangitis, when the infection, presumably, is still more or less limited to the uterus. Experience has shown, says DeLee, that uteri are usually removed too late, to do any good, and in those cases where the courageous operator has removed the uterus early, he could never be sure that the operation was necessary. The operation may have killed her, or, if she got well, may not have contributed to her recovery, and has rendered her sterile. I have seen cases where I felt that the operation really saved a life. Williams, Lea and Edgar contend that no one would expect any good to result where a general bacteremia exists and I agree with their views. Septic patients are the very poorest subjects for operation and anesthetics and great care should be exercised in the selection of subjects for this operation.

The operation for ligating the pelvic veins is still in its infancy. It is a formidable operation and the results are so far from satisfactory that even the

European clinics are approaching it with little enthusiasm.

In recapitulation, I will give you what I consider a good treatment for the relief of puerperal sepsis, of the type noted in the beginning of the paper.

1. Absolute rest in bed, in a good hospital, if possible, and with an intelligent nurse who is not afraid of work and who likes to look pleasant and cheerful all the time.

2. Plenty of warm fresh air and sun light.

3. Patient in Fowler position.

4. Remove all stitches and swab wound with pure tincture of iodine.

5. Good nutritious semi-solid or fluid diet. Feed at least every four hours. Plenty of good cold water to drink.

6. Take babe from the breast. The breasts may be kept in condition for nursing later by massage and pumping.

7. Tepid sponge baths every three or four hours, when the temperature is 102° or above, unless the patient objects. They seldom object.

8. A brisk cathartic at the beginning of the treatment. Then an occasional laxative to keep the bowels in good condition.

9. S. G. T. enemas for the relief of gas pains.

10. Seeping enema. I usually give it for one and a half hours and then discontinue for three hours and then repeat.

11. Cherry red iodine vaginal douches every four or six hours. These douches are given for sole purpose of flushing out the vagina and to keep it free from debris, and not for any specific therapeutic purpose.

12. Aspirin, twenty grains every four hours. I give it at night if the patient is awake.

13. If the heart is arhythmic and beats more than one hundred and twenty times per minute and is of poor quality, I give fifteen minims of digalen every three or four hours. It is given hypodermatically.

14. No visitors admitted except the family whom I request to have a cheerful expression when they call. The patient is assured that she will recover and she generally does under this treatment.

Surgery, sera and specifics are of little or no avail. There are other methods of treatment but the above outlined treatment has given me brilliant results and most of the cases treated by me have returned to normal in seven to ten days without any complications or sequellae so far noted by the patients or their attending physicians. When possible, I have a blood count made daily and the increase of the leukocytes and the decline of the polyneuclears is most interesting and gratifying.

In conclusion, I wish to say that the sum and substance of this whole matter is that the general practitioner is the man to prevent and also treat puerperal sepsis. It may be prevented by keeping the patient in good health and amid hygienic surrounndings before labor, and by conducting the accouchment in an aseptic manner in a clean place. If you are unfortunate enough to have a patient infected, she is to be treated with cleanliness, fresh air, good nursing and brains.

If you tell me that the above cannot be carried out in rural communities, I will say to you that there are no rural communities *so far as the practice of obstetrics is concerned today.* Some of my cases were treated in country houses, nursed by intelligent housewives. I demonstrated to them just what I desired and assured them that they were capable of carrying out my scheme of treatment, and the enthusiasm with which these good women applied thmeslves to their duty was most pleasing and satisfactory to the attending physician and myself. Please note that the young doctor, just arrived from college and hospital internship, will know how to practice aseptic obstetrics and how to treat sepsis in the most modern and approved manner. The women will soon learn of his ability and this matter will soon become of business interest to you.

It is not expected that this paper will interest those dreamers and therapeutic nihilists who are satisfied to practice obstetrics as was the custom when the new testament was in the process of formation. It is primarily intended for the progressive element of our profession whose ambition is to render the best service possible, even though it involves considerable trouble to save the life or health of the puerperal woman.

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Authorities consulted: Lea, DeLee, Davis Herman, Hirst, Schauta, Leopold, Wirthheim, Baldwin, Bonney, Leopold, Bumm and others from whose works much of this thesis has been abstracted.

PASSIVE MOVEMENTS IN ELBOW INJURIES.

Failure to recognize the pernicious effects of early passive movements in elbow injuries leads to continued inflammation of the joint and protracted stiffness from increased adhesions and callus formation, and may result in a severe degree of permanent disability later. Passive exercises may be usefully employed when the range of movement is increasing.—EDWARD W. H. SHENTON in *The Lancet.*

CYSTOSCOPY IN THE FEMALE.

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It is now twenty years since Howard A. Kelly published the description of a method of urethral, bladder, and ureteral exploration according to definite principles, and with certainty and comparative ease. For many decades before investigation along the line of bladder research of the boldest and most heroic kind had been carried on by zealous workers, but in the light of our present knowledge, the names of Howard A. Kelly and Max Nitze stand out above all the rest. As the electric instrument of Nitze enabled us to view with precision the hitherto unexplored bladder cavity in the living, so did the instruments of Kelly, coupled with the posture and reflected light, open this field to us for study and investigation in the female, limitless in scope and most promising in results, particularly so far as diagnosis and treatment were concerned.

Strange as it may seem to those unfamiliar with the actual technic of this method, it is, after all, easy of execution, the only requirements being the few instruments of simple construction, the distension of the bladder with air by the particular posture called by Kelly the "knee-breast position," and careful attention to asepsis and avoidance of trauma to mucus lining of organs concerned in the examination. The details of the cystoscopic technic of Kelly are known to everyone; but the appreciation of the ease and at the same time the value of the procedure have unfortunately reached comparatively few men in the surgical and urological profession. The urologist is concerned apparently with the more difficult and more serious affections of the male urinary organs, and is content with the application of his technic to the investigations in the female. Now does not this seem more than strange, inasmuch as the ordinary cystoscopy applied to the female fails in several most important features, among which are, first, the direct observation of every part and lesion of the bladder, urethra, ureteral meatuses, and interior of the bladder; and, second, the ease with which topical treatments can be applied, the ureters catheterized, foreign bodies removed, and most minute descriptions of pathological states recorded?

As to the best means of exploring the bladder in women, it can be said that there are but two methods of choice: first, the cystoscopy of Nitze, or its modifications, with water as a medium for distension; second, the reflected light with Kelly's cystoscope, with air as a medium. The former is much easier to perform; the difficulties encountered in the procedure in the male are not met with; one can use a long or short instrument, and the patient, as a rule, resists less; but in the thorough examination of the interior many difficulties are encountered. It will suffice to briefly review a few of these difficulties:

(A) The painful bladder in women will not yield to water distension as kindly as the male bladder, and the patient becomes extremely restless and nervous, thus requiring a general anesthetic, or, she is unable to retain the fluid, with the disturbing consequences incidental to bladder contraction, and variation in quantity of fluid retained.

(B) The landmarks in the female bladder when it is distended with fluid are so few that if there exists either a distortion because of pelvic tumors, swellings, deflections from adhesions, or displacements, one will easily become confused unless he is fortunate enough to have an uncomplainingly submissive patient, which is the exception rather than the rule.

(C) The urine cloudy from pus or blood, as, in the case of cystoscopy in the male, often so blurs the visual field that the examination has to be abandoned to be repeated later.

(D) As inflammation and ulceration may be presented in large or small patches, thus giving the bladder an angry red, beefy appearance, it is very apparent with what difficulty one would come to any definite conclusion as to pathology, or with what limited success one would find the ureteral orifices, should such a pathology exist in their vicinity.

(E) To view the entire cavity of the female bladder with the water medium with such care and precision as to inspect every portion with the lens close enough to the part to thoroughly identify it, even in a bladder not markedly pathologic, and to detect even minute lesions, such as fissures or ulcers, is impossible to anyone except a master of marvelously skillful technic, if for no reasons other than the mechanical difficulties in the way, or, because of the necessary pain and discomfort arising from the manipulations.

(F) Presuming that many of these difficulties can be overcome in any one given case with the Nitze cystoscope—though of course in a series of cases they must be presented as obstacles here and there—presuming that one has succeeded in inspecting the interior of the bladder, in making a diagnosis of, say, ulcer or foreign body, one can readily see the difficulties presented either in the way of topical treatments or in the easy and rapid removal of a foreign body.

None of these difficulties present themselves in the Kelly or air method of bladder examination.

(A) The entire interior of the bladder can be viewed in less time than it takes to describe the technic, and as Kelly has said, a few seconds are often sufficient.

(B) The landmarks, when the bladder is distended with air and the patient is in the knee-breast position, are plain and well defined. In the first examination she may need a little reassurance to become confident of freedom from pain or great discomfort, and she will usually be of the greatest assistance by changing positions, straining when requested, or answering inquiries in regard to location or character of pain.

(C) Should blood or pus escape from the ureteral meatus, it is at once apparent and can be easily collected, as can a culture or smear be made most readily from a swab direct from the area involved.

(D) Whatever pathology presents itself in the bladder mucosa, the eye is directly upon it, and its character, location, blood supply, the sensitiveness of the mucosa, contraction of bladder walls, or other phenomena, can be unmistakably observed and recorded.

Given a patient whose complaint, among other symptoms, is frequency of urination of varying degree with more or less pain at the time of or following the act of micturition, particularly if the pain be referred to or localized in the bladder, and especially if there be pus or blood or bacteria in the urine, which it is presumed has been carefully examined microscopically and chemically, one is justified in deciding to perform a cystoscopy along with the rest of the procedures of a thoroughly complete gynecological examination. The justification is more than emphasized by the discovery of some unlooked-for urological lesion somewhere along the tract, either latent or concealed, and of which the bladder symptoms or condition are but a part. If, in addition to symptoms, there is a history of previous uterine, tubal, urethral, or other infections, even a history of such diseases as typhoid fever or perirectal abscess, or suspected colon bacillus or gonorrheal infection, then the indications for a careful cystoscopic examination should not be overlooked. It is always necessary to make a most searching pelvic examination since the diseases of the pelvic organs very frequently are the primary causes of symptoms referable to the bladder. Conversely, in every instance where one feels justified in recommending a major gynecological operation and urinary symptoms are present, a cystoscopy should be a routine procedure prior to operation, and it would be of inestimable benefit to many patients if it could be done prior to many minor operations. It is a good rule to make a cystoscopic examination after each major pelvic or abdominal operation, upon the appearance of any bladder symptoms, and more especially in those cases that require catheterization before or after operation.

In the first exploration of a case for the purpose of diagnosis, especially one in which a foreign body is suspected, or where it is expected to have to catheterize the ureters, the electric cystoscope might be chosen because of the ease and certainty with which the search can be carried on, unless such interferences as the following present themselves, namely:

(a) Inability of the sphincter vesicae to retain the water injected into the bladder ;(b) pus or blood escaping from the ureteral orifices or a fistula, blurring the vision by clouding the water medium; (c) or resistance of the bladder wall to the fluid, preventing the proper distension of the bladder.

Upon making the diagnosis of a definite lesion, or discovering or locating a foreign body small enough to be removed through the urethra, it is advisable, unless the electric instrument is strongly indicated, to dispense with it and follow up the case for the purposes of inspection and treatment with the simpler and more satisfactory method of Kelly. It should not be overlooked that there are some cases, I should say five per cent., which, owing to hypersensitiveness and extreme strangury, will require a general anesthetic, and in these cases the cystoscopy could be made either with the electric cystoscope, or with the Kelly method, or with both.

To illustrate the great value of this diagnostic procedure, in the routine examination of women, the following cases are taken from a series during the last twelve months; the chief point demonstrated by their report is the ease and importance of a cystoscopic examination, more especially the more direct method of Kelly.

CASE 1:—Mrs. G., age 30, had for a number of years a right movable kidney with occasional attacks of temporary hydronephrosis. She presented a history of frequent urination, but pain was not a marked symptom. Urine analysis absolutely negative. She had a retroversion of the uterus, the broad ligaments were abnormally tender on pressure, and the vaginal outlet was relaxed because of a perineal laceration. Prior to operation early in 1914 cystoscopy and ureteral catherization performed by the Kelly method. Urine normal; bladder and trigone free of hyperemia or inflammation, but urethra very intensely congested, displaying a

fiery redness. A few topical applications to the urethra subsequent to her recovery from operation sufficed to give entire relief.

CASE II:—Mrs. G., age 19; married fourteen months. No history of pregnancy. On March 30, 1914, began to complain of an irritability of the bladder. Urine passed frequently and freely with some burning at the end of the act of micturition. A careful gynecological examination revealed the pelvic organs apparently normal, rectum normal, and no pathological findings on the exterior genito-urinary organs. The urine analysis was absolutely negative; no excessive acidity, pus or leucocytes being found. Cystoscopy: Bladder mucosa normal; ureteral orifices easily found and normal, but the trigone was intensely hyperemic and quite painful to the touch. The urethra was redder than normal, but not pathologic. A few topical applications of weak silver solution through the Kelly cystoscope brought on a disappearance of the symptoms.

CASE III:—Mrs. E. T., age 24. This case will serve to illustrate ulcerative cystitis as well as foreign body removal. The patient was operated upon in 1905 for acute appendicitis;; after her recovery she began to pass blood from the bladder, and complained of considerable pain on urinating. She has always been very much of a neurotic, and the history of her case is rather thrilling, even before I first saw her in 1910. She had a nephropexy performed on her right side in 1905, two months following the operation for appendicitis; a gall-bladder drainage and stomach exploration in 1909; the wound failed to heal, so the abdominal scar was removed and the wound resutured in 1910, and in July, 1914, the climax in the way of operations was reached when a surgeon finally removed her tubes and ovaries through an abdominal incision. During her early visits to me in 1910, when she was being treated for a tubal infection of some sort, my attention was called to the condition of her urine, which was found to be bloody, purulent, offensive in odor, sometimes alkaline, sometimes acid, but always attended by severe pain in voiding. An occasional irrigation followed by the instillation of some weak silver solution, always gave her some relief, only to be followed by symptoms just as severe as before.

On December 3, 1910, I prevailed upon her to submit to a cystoscopy under an anesthetic. A bit of glass catheter 3 c. m. long was discovered in the bladder and removed with ease. (It might also be of interest to record here that on May 31, 1910, during a vaginal examination several pieces of glass from an irrigating tube were removed from the vaginal canal. No definite history of how they happened to be there could be obtained, but she had had several vaginal douches at one of our hospitals where the glass irrigating tube was used.)

The symptoms were not relieved, however, and she returned for another cystoscopy in September, 1913. This was done in the knee-breast position by the Kelly method. The ureters were catheterized with ease; the urine from each side was perfectly normal, the urethra dilated very readily and distension was extremely satisfactory. The bladder showed a uniform redness of inflammation seen in a diffuse cystitis, but no ulceration except over the trigone and around the internal ureteral meatuses, where there was found a number of small ulcers, like cut out patches, very painful to the touch. The urethra was intensely inflamed. Near the posterior pole, about 2 c. m., below it on a vertical line, was seen a bit of glass tubing (a piece of catheter) with the free end rounded, the other end having penetrated the bladder wall for a distance of probably 3 m.m., and held firmly in place by its depth of penetration. In a few seconds this was removed with alligator forceps, and one can easily imagine the relief following.

The bladder recovered its tone and color, the ulcers nearly all disappeared, but there were still present in this case a few symptoms suggestive of the presence of some foreign body. Both the electric cystoscope and the Kelly method failed to demonstrate anything further, but on September 14, 1914, another cystoscopy by means of the electric instrument revealed the presence of another piece of glass catheter about 2 c.m. long at the base of the bladder on the trigone within the urethrovesical fold. She was placed in the extreme lithotomy position, the bladder was distended with air, and the glass was removed in two pieces, together with several others, by means of the alligator forceps and the Kelly cystoscope.

The ease with which the case has been treated topically and the exactness with which the patches of ulceration could be located, recorded and observed in their healing compels me to emphasize and recommend the air method of cystoscopy in cases similar to this one.

CASE IV. indicates simply the value of the procedure as a routine measure in diagnosis: Mrs. B. came to me after she had been under the care of two physicians, one of whom recommended an exploratory laparotomy and the other had not made a diagnosis, but had been prescribing for her. The history briefly was that she had been having, for the past few months, a pain in the right loin, more especially in front and along the right ureter; same pain in the right lumbar region, and but very little disturbance in urination; she had lost a little weight and occasionally had fever. No history of a renal colic was obtainable. The catheterized urine from the bladder was slightly cloudy, acid in reaction, and contained a few pus cells and a very slight trace of albumen. (Observe the acid pyuria.) Cystoscopy revealed absence of cystitis; the trigone slightly congested; ureters found with ease; right ureteral opening somewhat reddened; catheterization of the ureters by the Kelly method showed the left urine perfectly normal; the right contained much pus and dead epithelium; no bacteria could be demonstrated. While a diagnosis scientifically exact has not yet been made, the patient being very unreliable and irregular in her reports for examination, yet one can readily conclude as to the great value of the information thus far obtained.

CASE V. is simply to demonstrate the value of the

technic as applied to cases in which a major operation is planned: Mrs. L., in March, 1914, suffering from carcinoma of the cervix, underwent a radical Wertheim operation at Wesley Hospital. When the patient was brought to the operating room, it was decided to insert ureteral catheters to be used as guides in the dissection of the broad ligaments; she was placed in the Kelly position, and in less than five minutes I had both ureteral catheters in place and the anesthetic was then administered.

In conclusion, the points in this short paper which it is my desire to emphasize are:

(1) The electric cystoscope is an instrument indispensable to the general or gynecologic surgeon, and he should practice its use if he is to succeed in increasing his percentage of correct diagnosis.

(2) As a routine procedure in women, Kelly's is the method of choice and is superior to any other method known today.

(3) It is not a difficult procedure, and is one that can be mastered by nearly any one who has the patience, zeal, and desire to master it. As a diagnostic aid and as a means for treatment, it is of inestimable value, and should be more generally adopted as a procedure in the examination of women presenting bladder symptoms.

THE TEACHER OF SURGERY.

The teacher of surgery must be more than a mere operator. The progressive surgeon must be a man of good health, tireless energy, temperate habits and rigid honesty, with a courage based upon an accumulated knowledge which can be drawn upon in emergencies and difficulties. He must possess a power of decision based upon care and observation, in placing at their true value the results of the research of others, promptly seizing and applying discoveries of merit, but never going to the extent of dangerous radicalism. He must be able to make correct deductions from histories of patients to conclusively advise the indicated treatment and prognose the probable results. He must constantly aim to achieve distinction and fame, acknowledge the qualities of thoroughness and patience, be rapid and correct in thought and have in him the true fire of genius. He must be an accurate diagnostician and use careful judgment in deciding as to the advisability of operating and as to what particular method should be pursued; he must, moreover, be prepared to meet the many emergencies which inevitably arise during an operation and which demand prompt and decisive action, oftentimes modifying the opinion formed beforehand.—H. W. WIGHTMAN in the *Medical Record*.

DIAPHRAGMATIC HERNIA, REPORT OF A CASE.*

ROYALE H. FOWLER, M.D.,
BROOKLYN, NEW YORK CITY.

J. W., age 53, native of Ireland, was admitted to Kings County Hospital, on the service of Dr. J. Bion Bogart, October 10, 1913, from the Long Island State Hospital. The patient was unable to give an account of his illness because of deafness and defective mentality. Communication with the hospital authorities revealed the facts that the patient had suddenly complained of pain in the abdomen four days previously, and was put to bed. He told the doctor in charge that his bowels had not moved in four days. He had vomited several times daily since the onset. Pain became more intense. Enemas and even croton oil had failed to produce a bowel movement. Vomiting was not fecal. The temperature did not rise above 100.5° A. M.

Physical examination: Well developed man, extremely deaf. Both eyes show interstitial keratitis. Impossible to see pupils. Teeth very poor.

Fig. 1.—Right side of chest has been removed.

Chest: Expansion fair and equal. Resonance good, front and back. Breath sounds broncho-vesicular; a few coarse râles heard.

Heart sounds, poor quality, no murmurs. Blood pressure, systolic 130, diastolic 100.

Abdomen distended, not rigid, a little edema of the abdominal wall. Tympanitic all over. Pressure over the abdomen causes little pain. Liver and spleen not palpable.

Extremities negative.

Notes. October 10 (on admission). Abdomen distended. Patient very noisy, vomited light green sour-smelling material. 1 P. M., vomiting continues every ten or fifteen minutes. Complains of severe pain after vomiting. Small amount of flatus expelled. 3 P. M., no results from compound enema. Severe thirst. 4 P. M., face flushed, body surface moist and warm. Total fluids for the day, tea, milk and water, 22 ounces.

*By courtesy of Dr. J. Bion Bogart. From the Surgical Clinic at Kings County Hospital.

October 11. 8 A. M., slept at intervals during the night, somewhat restless; pulse regular, fair volume. Abdomen still distended. 11 A. M., takes nourishment well. 4 P. M., retains nourishment. 7 P. M., small amount of feces and flatus from enema, unable to retain enemas, three involuntary evacuations. Total fluids, 46 ounces retained without vomiting.

October 12. 10.15 A. M., three grains of calomel given. 1 P. M., vomited small amount of green

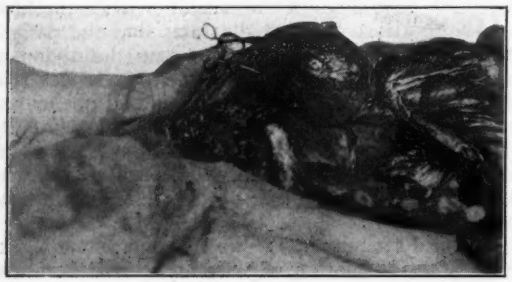

Fig. 2.

fluid. Total fluids, 40 ounces. 9 P. M., patient tossing about, noisy. 9.55 P. M., morphine.

October 13. 8 A. M., face pale, appears weak. 10.30, vomited three ounces of brown fluid without fecal odor. 11, small amount of flatus expelled with enema. Two involuntary evacuations during the night. 11.25, compound enema, return a small amount of fecal matter and flatus. Total fluids, 26 ounces. Notes by interne: Vomiting more frequent since admission and without effort. Calls out at

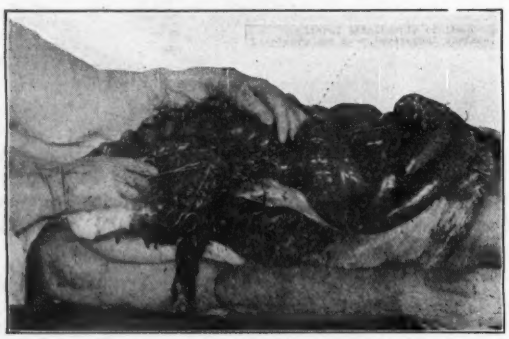

Fig. 3.—Right side of chest has been removed.

times as though in considerable pain. Abdomen more distended. No rigidity. Incontinence of urine. Rectal examination shows external hemorrhoids, but no obstruction felt low down. Prostate small.

October 14. 8 A. M., complains of severe headache and abdominal pain. Abdomen remains markedly distended. 10.30, vomited three ounces of brown fluid. 4 P. M., one ounce of castor oil. Total fluids, 37 ounces.

October 15. 8 A. M., face pale, lips dry, pulse irregular, rapid. Abdomen very tense, irrational. 9.30, vomited four ounces of curdled milk. 10, vomited a large amount of thick brown fluid, fecal odor. 11, lavage ice only. High colonic irrigation resulted in return of small amount of feces and flatus. 12, patient appears weaker, noisy. 2 P. M., expired.

Urine, Oct. 10—Alkaline, 1018, no albumen or sugar.

Blood—19,720 leucocytes. 83% polynuclears; 13% large and small mononuclears; 1% transitionals.

Temperature record, October 10—100°, pulse 120, respirations 24. October 11—Pulse 84 to 100. October 12—Temperature 101°, pulse 100. Thereafter until death temperature slightly above 99°. Pulse between 90 and 100; just before death 110.

EXTRACTS FROM THE AUTOPSY RECORD.

On opening the abdomen subcutaneous fat is found to measure about 1.5 cm. in thickness. It is of a yellowish color. Great omentum not seen on opening abdominal cavity. The intestines are

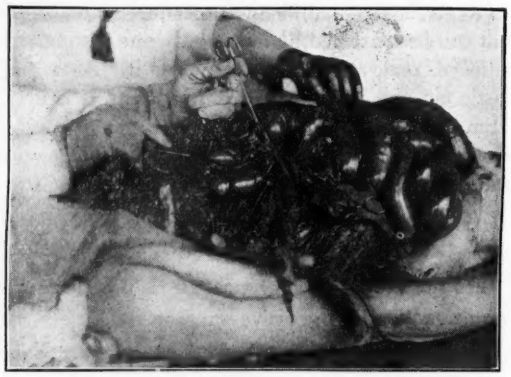

Fig. 4.—Sac opened.

greatly distended and covered with a plastic exudate. The blood vessels in the parietal peritoneum are distinctly injected. The parietal peritoneum on the right side, four fingers breadths below the umbilicus, shows a triangular patch of plastic exudate which measures 2½ x 1 cm. This patch corresponds to a similar one present in a loop of the small intestines. This was separated without much difficulty.

The large intestine was found to be tremendously dilated. It was traced upward to the diaphragm, where it seemed to be constricted. The intestines in the pelvic region were gangrenous and at several places perforations had occurred. Fecal matter was found in the pelvis and also near the spleen. Small and large intestines show post-mortem changes. Both are enormously dilated, the small throughout, the large to the middle of the transverse colon. In the cecum are small ulcers averaging a half-inch in width. They seem to be limited to the mucosa. There are multiple perforations in the sigmoid.

Rectum—Appeared normal, except for hemorrhoids at the anal opening.

Gall-bladder was tinged with green and contained no stones.

Liver—Weight 1637 grams, dark, slate-green in color due to post-mortem changes. On section this extended ¾ cm. beneath the capsule. The rest of the cut surface was a reddish-brown. Parenchyma appeared normal except for areas of fatty degeneration. Lobules were not distinct. There was congestion.

Pancreas—Weight 156 grams. It was firm and appeared normal on section except for slight interstitial changes.

The diaphragm reached to the fifth rib on the right side, and to the sixth rib on the left side.

On opening the thoracic cavity a sac which contained the intestines was found.

A diaphragmatic hernia had been produced about 1 cm. below and to the right of the ensiform cartilage. On opening the hernial sac, which was lined

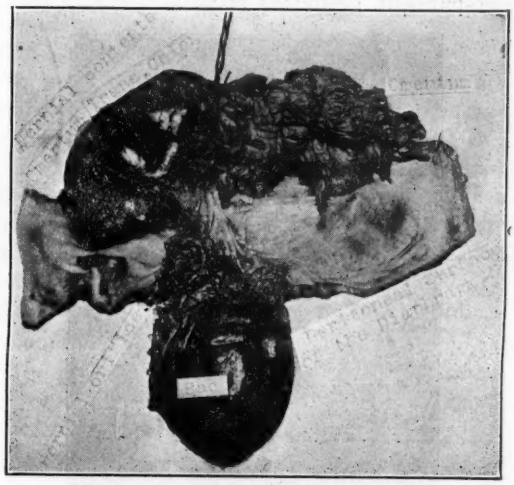

Fig. 5.—Showing the hernial contents removed and suspended above.

by peritoneum, it was found to contain the great omentum and about 20 cm. of the transverse colon. Omentum contained much fat and appeared normal. The intestinal loop was easily moved backward and forward through the hernial opening, but no attempt was made to pull all of the loop through. The under surface of the sternum was normal. The thymus was apparently replaced by fatty and connective tissue. The lung was bound by adhesions which were broken through with difficulty. The pleural cavity contained no fluid.

The lesions here reported and those not reproduced from the complete autopsy record, were:

(1) Right sided hernia of the transverse colon and omentum through the diaphragm at the site of Larrey's space. (2) Diffuse peritonitis of the lower abdomen, multiple perforations of the sigmoid; gangrene of the small intestines. Ulcers of the cecum. Plastic peritonitis in the upper abdomen. (3) Adhesive pleuritis, chronic pulmonary edema. (4) Myocarditis, chronic. (5) Parenchymatous nephritis, chronic. (6) Prostatic calculi. (7) Endocarditis, chronic, of the aortic valve. (8) Aortitis. (9) Bilateral corneal opacity. (10) External hemorrhoids.

For an elaborate consideration of this subject readers are referred to a contribution of Dr. Karl M. Vogel, which appeared in the *American Journal of Medical Sciences*, February, 1913.

280 Jefferson Avenue, Brooklyn, N. Y.

Collargol Injection of the Seminal Vesicles for Radiography.

The vas is isolated at a convenient point near the top of the scrotum by a transverse incision one-quarter of an inch in length. One per cent. novocain gives good anesthesia, but must be injected not only into the skin, but also into the tissues immediately surrounding the vas. The latter is then elevated on a probe-pointed director, and along the groove of this, between it and the vas, a strand of silkworm gut is inserted. This is tied in a loop and serves as a convenient handle. The vas is now opened by a tiny longitudinal incision and a drop or two of novocain is injected into its lumen. This serves a double purpose, that of anesthetizing the vas for future manipulation, and of determining its patency. In a few of our cases the vas was found to be occluded at some point along its course, making injection of the vesicle impossible. The patient is then placed on the *x*-ray table, and a small soft catheter is inserted, with its eye lying just within the prostatic urethra. Injection of first one seminal vesicle and then the other is done, using a filtered 10 per cent. solution of collargol. The capacity of the seminal vesicle, or at least the point at which it overflows into the urethra (as determined by the flow of collargol from the catheter), has been found to vary. In some cases 2 c.c. sufficed, in others 4 or 5 c.c. When each vesicle has been thus distended the radiogram is taken. Our practice thus far has been to have the bladder empty, the patient flat upon his back, and the *x*-ray tube placed with its center over the symphisis. The excess of collargol is then withdrawn from the bladder and urethra (although no evidence has appeared of an irritating effect on these structures). The silkworm gut loops are removed and the vasa allowed to sink back into the scrotum. There has been no bleeding from the wound, and it has not been found necessary to close the opening by suture.—J. D. Barney in the *Boston Medical and Surgical Journal.*

Before employing a rubber catheter, test its resiliency. If it is brittle or cracked, discard it. Not infrequently a rotten catheter breaks off in the bladder while, of course, a rough catheter or sound may play havoc in the urethra.

APPENDIX VERMIFORMIS OF LARGE SIZE. REPORT OF CASE.*

S. MEREDITH STRONG, M.D.,
BROOKLYN, NEW YORK.

Any unusual pathological specimen, such as this appendix, is probably worthy of record.

J. E., male, cigarmaker, age 54 years, height 5 feet 7 inches, weight 220 pounds, came to me February 14, 1914. He had been in good health and had no reason to consult a physician since boyhood, except for fracture of the ribs three years ago.

The present trouble began about the middle of last November. Since then he had more or less pain in the lower right quadrant of the abdomen extending down into the groin. The pain was most intense just above Poupart's ligament and was worse at times. There had been no chill, but at times he felt cold. He had worked every day. His suffering had recently become worse and the pain for the last few days was intense. There had been no vomiting, but at times there was nausea.

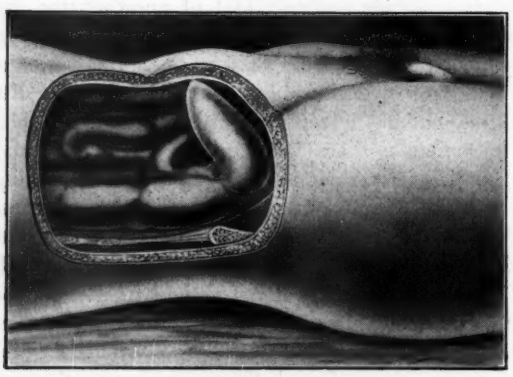

Fig. 1.

The man was stockily built, robust in appearance and of ruddy color. He had a corpulent abdomen. There was no distension or local swelling, but there was slight rigidity of the right rectus muscle. There was no tenderness except over a mass that could be plainly felt midway between the umbilicus and the brim of the pelvis, about the size of an orange and movable, but very tender. The abdomen was otherwise negative. Temperature 100°; pulse 100.

I operated upon the patient the following morning. Upon opening the peritoneum I found a pearly-white mass about the size of a pear, apex upward and slightly adherent to the anterior abdominal wall, wherefrom it was easily torn loose. It was movable except where it was attached to the posterior abdominal wall for one and a half inches. It occupied the correct position for the appendix, which, indeed, it proved to be. Cut No. 1 shows its relative position in the abdominal cavity. Upon relieving the posterior adhesions, the cecum was brought forward and the appendix detached in the regular way. The attachment to the cecum was larger than usual, being one inch across.

After removing the appendix the cavity was drained in the usual manner. The patient made the usual recovery for a drainage case.

The appendix when removed (see cut No. 2) presented a pear-shaped, pearly-white mass, bent upward upon itself at nearly a right angle and with a well-defined mesoappendix, with a decidedly soft, fluctuating portion at the apex for about one-half inch at the part attached to the anterior abdominal wall. The lumen was dilated and the walls were hypertrophied to about a quarter of an inch in thickness. It measured 6 inches in length and 2⅛ inches in diameter and 6¾ inches in circumference at the center. The exterior was smooth and glossy and solid. It was densely filled with a grey-colored muco-purulent, gelatinous material.

Fig. 2.

Dr. Francis A. Hulst had the following to say about the microscopical section of this specimen:

"The tissue consists of inflammatory exudate of the subacute type, involving the various walls, all of which are distinctly defined except the mucosa, which was probably not well fixed because of the fixation of the organ in mass. The specimen shows the lymph in the submucosa as usually found in the appendix.

"The contents consisted of débris and broken-down tissue, and pus cultures therefrom were negative, probably because of the formalin solution in which the specimen had been suspended. This is not a cyst of the appendix, but an infection of an hypertrophied appendix."

The case here recorded is, then, a straightforward one of appendicitis, with an appendix, not cystic, but of great size.

The largest appendix I can find recorded in the literature is one presented by F. Grauer, of New York City, to the Northwestern Medical and Sur-

*Read before the Brooklyn Pathological Society, May 14, 1914.

gical Society in 1890. It measured 12⅞ inches in length; no mention was made of its width.

W. F. Howard reported a case in *Northwestern Medicine*, Vol. 4, No. 4, April, 1912. The appendix when removed was 5 inches long, 3½ inches in circumference near the distended apen, 1½ inches at the middle, where there was a torsion and constriction, and still smaller, about 1 inch, in circumference at the base, and was filled with a thick, purulent liquid matter.

Under date of April 13, 1914, George Brewer, of New York City, wrote to me:

"The largest appendix I ever saw measured 11 inches in length, extending well over into the left iliac fossa." He does not mention the diameter.

John B. Murphy, of Chicago, in a recent letter, referred me to Vol. 6 of Keen's Surgery, where I found under his name the following:

"In original article, Vol. 4, the length of the appendix was given from 1 to 9½ inches. To this may be added a case reported by A. Patel, measuring 10 inches. It was peculiarly shaped at the base, was nearly the same diameter as the ileum, then gradually narrowed until about the middle, where it was of the usual size, resembling the elongation of the cecum in canines."

Prof. George Huntington, of Columbia University, under date of May 14th, says:

"The largest appendix in our collection measures 24½ centimeters; the shortest one-half of a centimeter."

398 FRANKLIN AVENUE.

PASSIVE MOVEMENTS IN SPRAINS.

We are constantly hearing and reading about gentle passive motion in sprains. On what theory this advice is based it is hard to conceive by those of us who are constantly being called to treat the injurious effects of such procedures. Certainly we know that a sprained joint can be immobilized too long, but we also know that there is an acute stage even in a simple sprain when rest is the treatment, and especially is this true, as the sprain is accompanied always by a stretching of the tendons, capsules and ligaments and more or less synovitis; and many times, and perhaps always, there is not only stretching, but also rupturing and tearing of the structures mentioned above. How often do we see in sprains of the shoulder, after a few days at most, passive motion begun, and later, as the shoulder becomes more and more painfully stiff, forcible passive motion under an anesthetic, "to break up the adhesions," until the patient himself discovers, as he states, that the shoulder is getting worse and more stiff after each manipulation?—ARTHUR J. GILLETTE in the *J. A. M. A.*

HOW SHOULD THE SURGEON BE GOWNED IN THE OPERATING ROOM?

FRANCIS REDER, M.D.,
ST. LOUIS, MO.

"Will some one please wipe my face?". This is an expression from a surgeon at work that can frequently be heard in an operating room. There are times when a surgeon has good cause for having beads of perspiration upon his forehead, and it need not be during the hot summer time, either. It is very annoying to the surgeon to have his face bathed in perspiration while at work. He is unable to continue until his face is wiped. This means an interruption and often aggravation, because it is

very seldom that a face is wiped properly or satisfactorily. Especially is this true when a surgeon is compelled to wear glasses. Not very long ago my sympathy went out to a surgeon whom I saw at work on a common bile duct operation. He had gotten into a tight place and the beads of perspiration were pouring off his face. Two nurses were kept busy, one on each side of the surgeon, wiping his face. It was an ordeal for him, and his facial expression gave evidence of it.

While thus extending my silent sympathy to the surgeon, the thought of a surgeon's comfort while at work occurred to me. Really, when one considers the great amount of surgery that is being done, there are but very few operators who are properly gowned for the operating room.

Before giving my version of a proper attire for the surgeon in the operating room, an expression of condemnation is registered of him who operates in his undershirt. This is a base fault, a surgical

sin. At no time should the operator be more clean, more emaculate in his appearance, than when he steps up to the operating table.

What is the proper garb for a surgeon? Let us enumerate the necessary parts for his attire: For the head a piece of gauze, not less than six thicknesses, with a width of about four inches, long enough to encircle the head. This gauze bandage covers the forehead and should reach to the eyebrows. A similar gauze bandage is applied in a manner to cover chin, mouth (and nose if so desired) and the cheeks; it is secured on top of the head. Upon the head is then placed an operating room cap. This covers up the hair. From the illustration it will be seen that very little of the face is exposed. The dressing is not as hot as it appears. It is comfortable. The gauze bandages are thick enough to absorb all perspiration so that there is no need of any wiping—the face feels quite dry. This face dressing is best applied by the surgeon himself, as he can better adjust it to his comfort than a nurse. For the body, a medium heavy shirt of a cotton fabric (a basket weave is admirably suited to absorb perspiration), duck trousers and duck shoes (tennis shoes with white rubber soles), constitute an attire that is beyond criticism. These articles of dress, excepting the shoes, should be surgically clean, i. e., next to being sterile. The clothes are worn next to the skin, all other clothing (undergarments) having been removed.

In this garb the operator prepares his hands and arms for his surgical work. Having finished with this process, he proceeds to don his sterile operating room gown with the assistance of a nurse. It should be of a medium weight cotton fabric. The fabric known as "galatea" is a very desirable one. The gown should fit comfortably and have a length that reaches to the ankles. Its sleeves should extend to the wrist so that the operator may experience no difficulty in putting on his rubber gloves.

As a precaution and additional safeguard, it has been my custom to wear a pair of sterile bags or mittens over my gloved hands while the patient is being prepared for operation. These mittens are very loose and reach up to the elbow. They are made of medium heavy duck, which gives them a certain amount of stiffness, thus facilitating the placing of the gloved hands into them.

Some surgeons wrap a towel moistened with a 1:5000 bichloride solution, or with a normal salt solution, about their hands. This answers the same purpose, that of an auxiliary protection, while the final preparation of the patient is made. My preference is given to the mittens on account of their simplicity and their perfect protection. The idea was adopted by me after having seen Dr. Franklin Brady, Surgeon to the Roosevelt Hospital, in Philadelphia, wear them.

EMPYEMA THORACIS IN CHILDREN.

It should be a cardinal rule that as soon as we recognize the presence of pus in the pleural cavity, it should be evacuated at the earliest opportunity. Success in treatment depends largely upon its early removal, and if we can secure good drainage and keep the cavity free from sepsis, the risks of complications occurring are greatly diminished. I believe that the earlier the evacuation of the chest takes place the less chance is there of the development of purulent pericarditis and meningitis, which I consider are in the main due to the long continuance of pus in the pleural cavity. In most cases any attempt to relieve the effusion by aspiration is a dangerous waste of time, and is by no means an efficient method of treatment, but there are exceptions to this rule. In cases where the exploring syringe has drawn off turbid serum—by which I mean serum charged with pus cells—I have frequently aspirated with excellent results. Then, again, it should be tried in very young infants who are unable to stand a serious operation. Aspiration is also useful when the effusion is very large. It may in such cases be had recourse to on the day previous to incision, so as to avoid the danger of syncope due to the sudden evacuation of a large quantity of fluid. In small localized collections of pus it is also recommended, but I have had no experience in such cases. The objections to aspiration are that by this means we cannot remove all the pus, that large masses of fibrin are left; we get no drainage, and have generally to resort to other measures later. As a rule our choice lies between resection of a portion of rib and simple incision of the pleura, and there are points in favor of each method. By the excision of a portion of rib we undoubtedly get better drainage and less risk of sepsis, but, on the other hand, it is a more serious operation, takes longer time, and causes greater shock. Incision of the pleura is a very simple and easily performed operation, is followed by little shock, and the drainage is usually sufficient.—H. G. M. DUNLOP in the *Edinburgh Medical Journal.*

Unconscious patients should be catheterized at regular intervals of about eight hours.

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, DECEMBER, 1914.

WAR AND THE SURGEON.

The functions of the soldier are to destroy life, to maim or otherwise physically incapacitate those of his fellow human beings who are called "the enemy," to destroy property which might be of help to his opponents, and to appropriate from all sources whatever may be of aid in carrying out such aims. To these ends, all that science, art, and skill can produce are enlisted.

War continues until one side or the other has lost so many lives, has so many human beings incapacitated, and so much property destroyed that the remaining people are no longer willing to venture the hazard of being called upon for further sacrifice of themselves. The relic of the nation then stops the war: it ceases to fight and the war ends.

There are certain external agencies which keep war going and postpone the armistice which brings peace. One of these factors is the profit which the non-combatant nations can make out of the bleeding people. Another factor is the sympathetic interest of the non-combatant surgeon and the activities allied with him. Though the first of these is purely economic, the surgeon is no less its accomplice in keeping warfare alive. Thus we witness the spectacle of the people of the United States, with sanctimonious hypocrisy praying for the end of the war as a sort of Sunday performance, and during the week days lending their good offices to big business to send over to the soldiers grains, meats and other foodstuffs, guns, powder, shot, and shell, to keep the slaughter going—all in the interest of profits.

Then comes the surgeon with sweet-voiced nurses and bandages and sheets and pillow-cases and goodies and soft beds, with the assumption that he is mitigating the horrors of war. However much he is mitigating the discomforts of individual warriors, one thing is certain: he is prolonging war; and war is nothing but horrors. Sentimentalism, combined with a confused ethical sense which calls for impartiality, results in a neutrality which promotes war.

A very simple mind can grasp the fact that if it helps one side in warfare, it damages the other side. But our sentimental neutral is often too tardy in his mathematics to grasp the fact that if he helps both sides, he damages both sides.

If the commercial and sentimental neutrals were really interested in mitigating the horrors of war, they would employ their efforts to end the war. To end war is the best way to mitigate war. The last thing that one, who really loves his fellow men, and who truly revolts at war, would think of would be to go into battle with a double-edged sword and fight against both sides. This is what our neutral surgeons are doing; and when we look upon the cost of one day of it we may calculate what will be the cost of the next day—the cost to both sides, for both are daily losing; and in the end both are destined to be losers by the aggregate of their days of warfare.

Were the neutrals desirous of mitigating the horrors of war, instead of maintaining merely a commercial and sentimental interest in it, they would be acting more reasonably to throw all of their help upon one side and end it. War continues so long as the damages are fairly balanced. It ends when the balance is lost and an unbalance of damages takes its place.

War is the consummate social crime. The soldier is a person who goes forth to kill his fellow man. The hope that he may kill but not be killed sends him on his errand. He is not only a cold-blooded murderer; he also is a gambler. He hopes to do his unholy business, come off with his life, and be ever after proclaimed a "hero." Society with its nationalism, patriotism, race hatreds, militarism, perverted histories which glorify war, and the international quest for commercial profits, creates the soldier—the dupe of war. If he knew that he were to fare as badly as he hopes his "enemy" will, he would not go. The nearer to one hundred per

cent. the mortality of warfare approaches, the less will be the enthusiasm for its "glories." If the mortality could be brought up to one hundred per cent. the problem would be solved, and war would cease. Do the activities of the surgeon of the Red Cross make for the abolition of war or for its perpetuation?

If the man of fighting age refused to go to war, or if he was proclaimed the hero who had moral courage enough to stay at home and do his work and refuse to participate in the miserable business, then the problem would be solved. Do the activities of the Red Cross surgeon, who rushes blythely to the front to keep alive this "sport of kings," make for war or for peace?

History may contemplate with amazement the white-robed surgeon attempting to save, while about him are murderous men, with all of the appliances of science, bent upon destroying, lives—all zealously working together. Perhaps society will some day look back with wonder upon the anachronism of the skilful surgeon, with his infinite possibilities for human service, laboring day and night to restore to efficiency the butchers of men, that they may be returned to their cruel pursuit.

War is something more than hell. It is the crucible in which a social system is tested and found to be dross.

Let the participating surgeon not lay upon his soul the unction that he is a noncombatant and inspired only by his love of humanity. We should not be deceived. He is a part of the program of war. When it is over, we shall find him parading among its "heroes," and bidding for the recognition which is accorded to those who went forth to kill.

Were the impelling motive, behind the sentimental neutral, one of love for humanity and a burning zeal to sacrifice himself for mankind, there are ample fields yet unoccupied in the industrial struggle in every land. In our own country the preventable deaths in the economic warfare for livelihood and for profits are quite as appalling to the discerning eye as those of the European charnel. Here are the unaided hurt crying for help—hurt by machines and dust and poisons and rotten railroad ties and insufficient food and crowded slums—all because somebody is making money by withholding rightful human protection from them and robbing others of the wealth that they create. These suffering and dying millions go down to their graves without the stain of their fellows' blood upon their hands. They are soldiers in the world's warfare against the forces of nature, enlisted to make the world more pleasant and life more livable, they stand for life, and not for death, they need all the surgeons, nurses, Red Cross stockings, and shirts that are now consumed by the bloodthirsty men who go forth to slay the husbands of innocent wives and the sons of guiltless mothers and the fathers of weeping babes.

Here is the answer to this social riddle: War is a ruling-class game. It is the affair of Kings, ministers, imperialists, and the capitalistic seekers for markets and economic aggrandizement. The Red Cross surgeon prefers the approval and applause of this so-called "upper class." The exploited poor in the industrial struggle have nothing to offer him but a doubtful gratitude. To give himself to them and their cause with the abandon that he can give himself to the cause of war would mean also to court the disapproval of those who have the wealth and "honors" to bestow.

There is no neutrality in war. All who are parties to it are warriors—the surgeon no less than the blood-lusting dupe of the military insanity.—JAMES P. WARBASSE.

ADDITIONS TO THE EDITORIAL STAFF OF THE ANESTHESIA SUPPLEMENT.

Pursuant to its policy of *service*, the SUPPLEMENT OF ANESTHESIA AND ANALGESIA of the AMERICAN JOURNAL OF SURGERY announces the acquisition of some important associates to its international editorial staff, among whom may be notably mentioned such authorities as Prof. Charles Baskerville, Prof. Dr. Guido Fisher, Dr. Edward H. Embly and Dr. Torrance-Thomson.

Prof. Charles Baskerville, Ph.D., F.C.S., is Professor of Chemistry and Director of Laboratories in the College of the City of New York, and is renowned as one of the world's most noted experts on the chemistry of anesthetic agents. He recently collaborated in the preparation of Gwathmey's monumental American volume on "Anesthesia." Prof. Baskerville is at present completing some original researches, and the SUPPLEMENT expects to publish his results in the near future.

Prof. Dr. Guido Fisher is Director of the Royal Dental Institute of the University of Marburg, Germany, and the author of "Local Anesthesia for Dentistry," translated for American readers by Prof. Richard Reithmuller of the University of Pennsylvania. Prof. Fisher has been signally honored, during a recent visit, by the entire dental profession of the United States, and his co-operation as an associate editor will be appreciated by all those who are vitally interested in conductive and

mucus methods of analgesia in the surgery of the oral cavity.

Dr. Edward Henry Embly, M.R.C.P., is not only one of the most noted surgeons of Australia, but his researches on ethyl chloride, anemia, and posture and systemic conditions in relation to anesthesia have been extensively quoted in the surgical journals of America and England. He has promised not only to contribute his personal investigations in anesthesia and analgesia to the Supplement, but also to report on all important researches and advances in these subjects occurring in the Antipodes.

Dr. Torrance-Thomson, of Edinburgh, has been selected by the Executive Committee of the Scottish Society of Anesthetists as the most competent co-worker to represent the advancement of anesthesia in the land of Simpson, and his selection will undoubtedly receive the endorsement of those of the Supplement's readers who are familiar with his work.

The January issue of the Supplement will be replete with interesting articles on anesthesia and analgesia, among which may be mentioned "The Treatment of Post-operative Shock," by Prof. Charles Lieb; "Continuous Anesthesia and Analgesia with Somnoform—The Technic of Administration," by Wm. Harper DeFord, D.D.S., M.D.; "The Proper Depth of Anesthesia," by Willis D. Gatch, M.D., F.A.C.S.; "Percentages in Nitrous Oxid-Oxygen Anesthesia," by Karl Connell, M.D., F.A.C.S.; "Rebreathing in Anesthesia and Analgesia," by E. I. McKesson, M.D., and "The Advantages of Combined Anesthesia in the Operative Treatment of Hemorrhoids," by Isadore Seff, M.D. Also in the Department of Medico-Legal Aspects of Anesthesia and Analgesia there will be a review of American and Continental court decisions involving the relations of the anesthetist and surgeon to anesthesia, analgesia, and the law.—F. H. M.

A Fake Subscription Swindler.

A petty swindler has recently been operating among physicians in Pennsylvania and New Jersey. He has been taking cash in advance for "Subscriptions" to a well-known weekly magazine, with which he has no connection, and which he offers at half-price with a premium of ten volumes of fiction! He has been using subscription forms bearing the name of the American Press Association, to which concern he is also unknown.

Surgical Suggestions

A fine lacrimal probe is the most convenient instrument for sounding the salivary ducts.

A ring pessary will often give immediate relief in cases of moderate cystocele causing frequent desire to urinate.

Acute infections of the kidney (pelvis) by the bacillus coli communis, however alarming the symptoms, usually subside without operative treatment.

When there is bleeding from the tongue, post-operative or otherwise, and one feels reasonably sure that the hemorrhage is arterial, it can, as a rule, be easily arrested by passing the forefinger down to the epiglottis and hyoid bone and drawing the base of the tongue upward toward the chin.

RELIEF FUND FOR BELGIAN PHYSICIANS.

Elsewhere in this issue will be found the announcement of a fund that is being raised for the relief of destitute physicians in Belgium. In some of the cities and villages of that unhappy country the distress of our colleagues, it would seem, is quite as critical as that of many San Francisco practitioners after the earthquake, to whose aid the American profession generously responded.

ERRATUM.

In the article on Bone Transplantation with Autogenous Sliding Grafts, by Raymond C. Turck, published in the November issue of the Journal, the cross sections of bone illustrated in figure 11 are labeled "actual size." This is an error to which Dr. Turck has requested us to call attention.

Hip Joint Fractures.

At the hip-joint dislocations very rarely require open operation, but fractures not unfrequently do so: where any unusual difficulty is found in reduction it would be safer to cut down and free the neck of the bone from an obstructing structure than to use too great a degree of force. If paralysis shows that the great sciatic nerve is implicated a posterior incision would be called for, and an anterior incision in forward displacements of the head of the femur.—J. J. Clarke in *The Universal Medical Record.*

Surgical Sociology

Ira S. Wile, M. D., Department Editor.

The 48-Hour Week for Nurses.

In the reorganization of industrial society the labor union has played an important part. With the desire to promote the welfare of workers there has been great activity in securing legislation insuring shorter hours of labor, restricting the time and place of labor of women, and generally safeguarding the physical welfare of industrial workers of both sexes.

In the course of progress for social betterment there are undoubtedly types of legislation which when carried to their logical conclusion would result to the disadvantage of the state. For example, an eight-hour day law would hardly be practicable if forced upon the liberal professions. Professional life is largely distinguished from mere industrial duties by the large element of personal service entering into it. The restriction of hours of service for physicians would be almost a *reductio ad absurdom* of legislation in behalf of the restriction of hours of labor.

For many years nursing has been regarded in the light of a profession for women, and it appears strange to find legislation undermining the high standard of nursing by classing it as a type of labor which might well be restricted to a forty-eight-hour week. As a factor in lowering the efficiency of the nursing profession, union legislation of the type indicated is distinctly disadvantageous.

In New York State the registered nurse has assumed a higher professional standing than in many states of the Union. The nurses themselves have sought legislation to prevent the use of the word nurse by any persons save those duly qualified and licensed under the State Registration Act. It appears inconsistent to seek for the passage of laws modeled after the one enacted in California, but the State of Washington is contemplating the enactment of one restricting the hours of nurses so that it will apply not only to pupil nurses in hospitals but to graduate nurses in private practice.

The eight-hour law of California provides for the limitation of the work of pupil nurses to forty-eight hours a week. As originally drawn, the bill sought to include the graduate nurse, but, fortunately, the professional status of the graduate nurse was established and she was not condemned to suffer a restriction of her personal freedom. The California bill became a law June 14, 1913, since which time the hospitals of that state have been struggling with the administrative problems of giving adequate training to pupil nurses, limiting their payrolls, and maintaining adequate care for their patients without recourse to special nurses.

From the practical side of the question, the forty-eight-hour week has failed to provide adequate time for the instruction of pupil nurses. There have been distinct limitations in the field of experience. Incidentally, inasmuch as this law is applicable to all women except graduate nurses, even the dietitians and the women internes come within its provisions. As a result of the restrictions of time, the training, experience, and executive work of pupil nurses are particularly curtailed and nurses are not properly fitted to take up executive work and special nursing. Furthermore, nursing in the special branches receives decreased attention with the result that the graduate pupil nurse is not as well prepared for her varied experiences in private practice as their sisters graduated during the years previous to the enactment of this special law.

The constant shifting of nurses is decidedly to the detriment of the patients, particularly after serious operations and during the course of obstetrical and puerperal care. The establishment of a forty-eight-hour week requires an increase in the number of available nurses beyond the number required under a regular eight-hour-day schedule.

The fact that such a restrictive law has been passed in California should arouse the attention of hospital superintendents throughout the country. No less interested are the members of the medical and surgical fraternity who depend for their best results upon the careful and efficient training of nurses. Inasmuch as the public has to pay the increased cost for the administration of hospitals, together with the additional expenditure necessary for securing extra nurses to take the place of the restricted pupil nurses, it may be said that it is vitally interested in the effects of legislation of this character.

The union principle does not recognize the possibility of personal service and self-sacrifice. It lowers the levels of nursing education and hampers the development of the nursing profession. The high ideals which the public has come to expect from nurses will be distinctly lowered by reducing the status of a trained nurse to that of an ordinary eight-hour day laborer.

While there may be some justification for the criticisms which have arisen regarding the treatment of pupil nurses in some hospitals of this country, the solution of the problem lies rather in the correction of the causes of such criticisms than to summarily legislate in such a way as to make it more difficult for hospitals to give proper care to their patrons. The legislation of a forty-eight-hour week for nurses decreases the quality of those to be graduated, increases the cost of nursing to the general public, and reduces nursing from a high plane of professional life to the category of ordinary unprofessional workers. A further development of the forty-eight-hour law as applying to all women would work a serious injustice upon professional women of all types now engaged in work connected with hospitals. The limit to forty-eight hours a week, the period of service of a housekeeper, a dietitian, or a woman interne would work a hardship upon the individuals, the institutions with which they are connected and the patrons whom they indirectly serve.

Book Reviews

A Text-Book of the Diseases of the Nose and Throat. By Jonathan Wright, M.D., Director of the Department of Laboratories, New York Post-Graduate Medical School and Hospital, and Harmon Smith, M.D., Surgeon to the Throat Department of the Manhattan Eye, Ear, Nose and Throat Hospital; Clinical Professor of Laryngology and Rhinology, Cornell University Medical School. Large Octavo; 683 pages; 313 engravings and 14 plates. Philadelphia and New York: Lea & Febiger, 1914.

The authorship of this new work on the nose and throat is a sufficient recommendation to warrant the feeling that many new and unusual features are to be found in its pages. Dr. Jonathan Wright stands pre-eminent in the rhino-laryngological world as a research worker along pathological lines, and Dr. Harmon Smith has been recognized time and again by those closely associated with him as a thinker and original investigator.

This volume is unique as a text-book on the nose and throat in that the essential part of it deals mainly with etiological factors and pathology, most of which is based on the original work of the authors. Voluminous references are omitted to make room for the expression of original opinions.

Twenty-five chapters divide the book into separate, essential parts. It is well illustrated with many original drawings and beautiful plates. Although exception may be taken to minor details, the general plan is so well worked out that we venture to state that it far surpasses anything on this subject that has been written within recent years.

Diseases of the Nose, Throat and Ear, Medical and Surgical. By William Lincoln Ballenger, M.D., Professor of Otology, Rhinology and Laryngology, College of Physicians and Surgeons, Department of Medicine, University of Illinois, Chicago; Fellow of the American Laryngological Association; Fellow of the American Laryngological, Rhinological and Otological Association; Fellow of the American Academy of Ophthalmology and Otolaryngology, etc. *Fourth Edition*, revised and enlarged; large octavo; 1,080 pages; 536 engravings, and 33 plates. Philadelphia and New York: Lea & Febiger, 1914.

The distinguishing feature of this new edition will be found in the complete chapter on the labyrinth. The book has been completely revised and has been added to in many ways, and has thus increased its value. Among other new matters may be mentioned the complete description of Mosher's frontoethmoid operation. Mention is also made of the work on hay fever by autogenous vaccines. The section on functional tests of hearing has been rewritten. Among other matters taken up are Haynes' operation on the cisterna magna for hydracephalus, vaccine theraphy and the His leukocyte-extract. The use of salvarsan in the treatment of syphilis of the brain and auditory nerve is gone into thoroughly.

Life and Law. The development and exercise of the sex function, together with a study of the effect of certain natural and human laws, and a consideration of the hygiene of sex. By Maude Glasgow, M.D. Duodecimo; 194 pages. New York and London: G. P. Putnam's Sons. The Knickerbocker Press, 1914.

This is one of the most eminently readable and effective books upon the sex question that we have encountered, for the reason that the author is a close student of biology as well as unusually well versed in the medical, legal and social aspects of her theme. Dr. Glasgow traces the earliest forms of sex instinct in the lower animal; she then expounds the physiology of sex relationship and fecundation in the human being. From this she passes to a consideration of gonorrhea and syphilis and their ravages, leading inevitably to a discussion of prostitution. The work ends with suggestions of measures to combat the sexual evil.

Manual of the Diseases of the Eye, for Students and Practitioners. By Charles H. May, M.D., Chief of Clinic and Instructor in Ophthalmology, Columbia University, New York, 1890-1903; Ophthalmic Surgeon to Mount Sinai Hospital; Consulting Ophthalmologist to Bellevue Hospital, New York, etc., etc. *Eighth American edition.* Duodecimo; 440 pages; 377 illustrations. New York: Wm. Wood & Co., 1914.

A new edition, or a fresh issue, of this excellent and remarkably popular manual is as welcome as the first breath of May—and comes almost as regularly. In addition to the seven preceding editions, this small work has been reprinted eight times for the American profession and its fourth British edition is in preparation. It has been translated into German, Italian, French, Dutch, Spanish and Japanese—in all of which it has had two to four editions. We expect yet to see the work appear in Russian, Turkish, Hindustani and all of the Philipino languages.

A comparison of this with the seventh edition shows that the work has, indeed, been thoroughly and conscientiously revised throughout. It still maintains, however, its distinctive character as a student's manual, the author keeping his additions within the limits of 30 pages of text and 17 illustrations.

Urgent Surgery. By Félix Lejars, Professor Agrégé à la Faculté de Medicine de Paris; Chirurgien de l'Hôpital Saint-Antoine. Translated from the Seventh French Edition by Wm. S. Dickie, F.R.C.S.; Surgeon, North Riding Infirmary, Middlesbrough; Consulting Surgeon, Eton Hospital, Eng. *Third English Impression* (*Eighth Edition*). In two large octavo volumes. *Volume I* (*Introductory—Head—Neck—Chest—Spine—Abdomen*). 614 pages; 485 figures and 10 plates. New York: Wm. Wood & Co., 1914. Half-morocco, $8.00, net; cloth, $7.00, net.

Lejars' "Chirurgie d'Urgence" is easily the best work on emergency surgery, the most popular, the most interesting, the most replete with valuable practical hints and observations. It is not difficult, therefore, to understand why it has appeared also in German, Italian, Japanese, Spanish, Russian, Hungarian and, now for the third time, in English.

Of the two volumes of the preceding English edition, reviews at some length appeared in the Journal, 1910, 1911. In these the merits of the work were set forth and its general character described. This edition has been brought quite up to date and there are five new brief but interesting chapters on *acute dilatation of the stomach, acute pancreatitis, obstruction of the mesenteric vessels, sigmoiditis and perisigmoiditis,* and *dislocation of the pelvis.* There are many changes and additions to the excellent illustrations. We would repeat our earlier criticism that the operative treatment of fractures, other than of the skull, does not belong in the realm of emergency surgery and, properly, should not appear in such a work as this—not a severe criticism, to be sure.

Chemistry for Nurses. By Reuben Ottenberg, A.M., M.D., Lecturer to the Nurses' Training School, Mt. Sinai Hospital, New York; Instructor in Bacteriology, College of Physicians and Surgeons, Columbia University, and Assistant in Clinical Microscopy, Mt. Sinai Hospital. Duodecimo; 141 pages. New York: The Macmillan Company, 1914. Price, $1.00.

Believing that some knowledge of chemistry is indispensable in the education of the trained nurse, and realizing that there is no book that takes up the subject in a manner suited to the limited technical knowledge of the nurse, Ottenberg has prepared this little manual. The book takes up in a very simple and elementary manner the fundamental principles underlying the chemistry of the body, and lays particular stress on reactions and tests in common use which the trained nurse ought to understand. The style is simple and direct, and the little volume fulfills its purpose admirably.

The Pharmacy Handbook. By F. W. CROSSLEY-HOLLAND, F.C.S., Pharmacist; Member of the Pharmaceutical Society of Great Britain, etc. Duodecimo; 224 pages. London: HENRY FROWDE and HODDER AND STOUGHTON, 1914. Price, $2.00.

As the author says in his preface, this book is to present ready information matters which come within the purview of the practicing pharmacist. The subject matter is up-to-date, chapters being devoted to hormones, sera, vaccines and other newer therapeutic remedies. The book contains a great deal of useful information, including many tables for ready reference.

Practical Bandaging, Including Adhesive and Plaster-of-Paris Dressings. By ELDRIDGE L. ELIASON, A.B., M.D., Assistant Instructor in Surgery in the University of Pennsylvania Medical School; Assistant Surgeon, University of Pennsylvania Hospital, etc., etc. Octavo; 124 pages; 155 illustrations. Philadelphia and London: J. B. LIPPINCOTT COMPANY, 1914.

This is a brief presentation of the subject, written for students and nurses. The typical bandages are described and, in addition, methods found advantageous by the author. All the types of bandages that one need know are to be found succinctly described in Eliason's work. The illustrations are unusually clear and well chosen.

Progress in Surgery

A Résumé of Recent Literature.

Roentgenologic Observations on the Function of the Ileocolic Valve With Special Reference to the Causation of Ileac Stasis. J. T. CASE, Battle Creek. *Journal American Medical Association,* October 3, 1914.

Case has studied the question of the competency of the ileocolic valve and of its incompetency as a cause of intestinal troubles. He sums up the evidence for its normal competency as follows: "1. The ileocecal valve is almost universally present in vertebrate animals; and, at least, in the dog, pig and cat, the valve is competent to the enema, withstanding enormous distention of the colon by fluid and gas. 2. By means of a string passed through the alimentary canal traction may be made on the valve lips, producing temporary incompetency. 3. In about one-sixth of the three thousand persons, most of them constipated and all suffering from gastro-intestinal disturbances, the bismuth enema passed the ileocecal valve and filled the terminal ileum for varying distances. 4. The valve incompetency thus determined is a constant phenomenon in those cases. 5. Patients with incompetency of the ileocecal valve describe characteristic disagreeable symptoms apparently due to passage of the enema into the small intestine. 6. In the marked cases there is also observed a reflux of ingested bismuth from the colon back into the ileum. 7. The occurrence of the incompetency is, to a large degree at least, independent of the temperature or composition of the opaque enema. 8. The incompetent ileocolic valve may be restored to competency by a simple surgical procedure, the competency persisting in some cases at least a year and a half. 9. In operation on patients with incompetent ileocolic valve the small bowel is found filled with gas to a very disturbing degree. 10. It is possible in the operation of ileosigmoidostomy to construct an efficient artificial ileocolic valve which will successfully act as a barrier against reflux from the colon. 11. Definite deviations from the normal anatomic structure are found at operation on cases of ileocecal valve incompetency. 12. Post-mortem studies show the ileocolic valve to be competent in the great majority of cases."

End-Results in Cases of Gastric and Duodenal Ulcer. ELLIOTT P. JOSLIN, Boston. *Journal of the American Medical Association,* November 21, 1914.

Joslin traced 9 per cent of the cases of gastric and duodenal ulcer seen in private practice during the last sixteen years. A number of cases of gastric or duodenal ulcer were revealed that were not so originally diagnosed. The basis of the diagnosis was the history, with special attention to the symptoms of hyperacidity, pain, hemorrhage, perforation, the duration of the case and the after-history, including also the facts developed by surgery and the necropsy reports. The total number of cases was 234, and 213, or 91 per cent, were traced to date; 142 of the patients were men; 92 women. The average age of the men was 45 years when first seen, but the age at onset was 38 years and 8 months. The corresponding age in women was 36 years and four months and 30 years and 10 months at onset. The average duration of ulcer in cases still unrelieved is 11 years and the average duration before the cases reached the surgeons, 10 years. One hundred and thirty-one patients received only medical treatment; 39 per cent of these recovered; 42 per cent were relieved; 12 per cent were unrelieved and 7 per cent are dead. Of the patients operated on when medical treatment failed 82 per cent were traced and 40 per cent are well; 16 per cent are relieved, 12 per cent no better and 32 per cent dead. Deducting twelve deaths for which the surgeon should not be held responsible, there were 70 surgical cases; 47 per cent now well; 19 per cent relieved; 14 per cent unrelieved and 20 per cent dead. The combined medical and surgical results show at present 84 patients well, or 39 per cent; 68 patients, or 32 per cent relieved; 26 patients unrelieved and 35 patients, 16 per cent, dead. Twelve, or 6 per cent of the 213 patients traced, died of cancer, and of the 46 patients now dead the mortality from cancer was 26 per cent.

Value of Roentgenography in Diagnosis of Diseases of Larynx and Trachea. SAMUEL IGLAUER, Cincinnati. *Journal of the American Medical Association,* November 21, 1914.

Iglauer finds roentgenography particularly valuable for the study of the normal process of ossification of the larynx, which should be understood to appreciate the pathologic changes of the organ. He describes the technic, which is simple: "The patient sits on a chair or lies on a couch with the plate (8 by 10) in contact with the side of the neck and parallel to the median plane of the body. The patient is instructed to hold his breath and not to swallow during the exposure, which requires about six seconds. A profile picture of the larynx is thus obtained, with one side of the larynx superimposed on the other, but the side in contact with the plate comes out very distinctly. The roentgenogram of the normal larynx in tuberculosis, syphilis, cancer, fractures and other conditions are also described. While satisfactory diagnosis of diseases of the larynx and trachea can be made by the ordinary methods in most cases, the changes in the underlying and adjacent structures which are more or less involved with the mucosa are shown also by the Roentgen examination, and the data obtained are of great value in guiding operative procedures. In stenosis or distortion of the lumen or trachea the ray usually reveals the seat, the nature and extent of the lesion. Owing to the ease with which it is made, the ray has a special value in the examination of children and nervous patients.

Concerning Primary Resection of the Large Intestine. (*Zur Frage der Primaeren Dickdarmresektion.*) R. VON RAUCHENBICHLER, Musbruck. *Archiv fuer Klinische Chirurgie,* Vol. 105, Part I.

This paper is based upon a careful study of the immediate and final results of a series of thirty-seven cases of primary resection of the large intestine. Most of the operations were done for carcinoma of the bowel. The author's chief purpose is to demonstrate that, after all the factors are considered, primary resection, rather than the two and three-stage procedures, is the operation of choice. However, it is contraindicated in the presence of acute

obstruction. Chronic ileus is not a contraindication, provided the patient's general condition is reasonably good. There is no striking difference between the mortality of primary and several-stage resection. The former offers the patient the briefest period of convalescence and does not subject him to the possibilities of complications from more than one operation. Besides, it makes a much wider removal of the growth possible than does the several-stage procedure, in cases of very extensive tumors. The author's analysis indicates that adherents of the several-stage operation are therefore much more prone to perform palliative operations than those who regularly make primary resections. In this sense the end-results of the latter are far more satisfactory.

The Physical Diagnosis of Displacement of the Colon. JOHN H. MUSSER, JR., Philadelphia. *Interstate Medical Record,* September, 1914.

Although according to Musser the routine outlining of the colon in the course of a physical examination is neither necessary nor important, there are certain conditions in which such an examination is indicated. Whenever this is the case, the author advises the use of a rectal tube and an attached rubber bulb by which air may be forced into the large intestine. By means of this inflation, which is well borne by the patient, the outlines of the large intestine may be fairly well mapped out. The cecum, though it is ordinarily to be felt in only about 20 per cent of cases, may be palpated in the majority of patients when inflated. The following method of auscultatory percussion is recommended: the stethoscope is placed over the cecum and the abdomen percussed. When the percussion takes place over the colon, the sound heard in the stethoscope over the cecum will suddenly change in character and intensity.

Luetic Contractures of the Stomach. E. L. TUOHY, Duluth, Minn. *Interstate Medical Journal,* September, 1914.

The author gives a very complete review of the literature on syphilis of the stomach and adds to the reported cases two of his own which he believes are gastric conditions of luetic origin. Both the cases show hour-glass stomachs, have positive Wassermann reactions and improved markedly under specific treatment. Although there is no way of absolutely proving the condition in the stomach to be due to syphilis, the prompt amelioration of the symptoms and the consequent rapid gain in weight would seem to point to the luetic origin.

On practical grounds it must be agreed that syphilis does involve the stomach—that the gummatous or ulcerating tissue can cause scarring and shrinking—and that hour-glass stomach might theoretically occur. To go further, and state positively that syphilis alone does this in an individual case, independent of any other processes, premises an hypothesis which cannot be too cautiously made.

The Employment of Paravertebral Anesthesia in Gall Stone Surgery. (*Die Paravertebral Anesthesia in Dienste der Gallenstein Chirurgie.*) A. T. JURASZ, Leipzig. *Zentralblatt für Chirurgie,* August 29, 1914.

By paravertebral anesthesia Jurasz refers to the cocainization of the spinal roots, a method of anesthesia first suggested by Sellheim. It has been used with success by various surgeons in abdominal surgery, and is now advocated by Jurasz for the removal of gall stones. Jurasz advocates it only for cases where, for other reasons, general anesthesia is not practicable. The technic consists (in general terms) in injecting about 5 ccm. of a one per cent novocain solution into the spinal roots of the side upon which the lesion is. (For the method and necessary landmarks the reader is referred to the original paper.) For gall-bladder surgery, the spinal ganglia from the sixth to the twelfth dorsal are anesthetized. Jurasz reports two cases in which the anesthesia proved eminently successful.

Permanent Drainage of Ascites. (*Zur Dauerdrainage bei Ascites.*) A. OBERST, Freiburg. *Zentralblatt für Chirurgie,* September 12, 1914.

The various methods of making drainage of ascites into the general circulation all have their disadvantages, especially the methods whereby the peritoneal cavity is made to drain into the subcutaneous tissues of the abdomen. (Glass bobbins, tubes, wire, silk threads.) In order to obviate these disadvantages, Oberst suggests an ingenious operation whereby a flap of skin taken from the abdominal wall is buried in the form of a tube or gutter, communicating on the one hand with the peritoneal cavity and on the other with the subcutaneous tissue of the abdominal wall. The operation is simple and possesses the great advantage that no foreign body is introduced and the canal or gutter thereby remains permanently potent.

Pituitary Extract in Obstetrics. SAMUEL J. DRUSKIN, New York. *American Journal of Obstetrics,* October, 1914.

The author is enthusiastic over his results. He holds that no forceps operation, no pubiatomy or Caesarian section in the lesser degrees of pelvic contraction, should be performed without a previous trial of pituitary extract. No manual separation of the placenta should be attempted without the previous administration of this drug. The author believes it should be given to prevent uterine atomy and to combat meturrhajia of the puerperium, foul-smelling lochia and retained secundines. Druskin has used it with satisfaction even after the induction of the "twilight sleep."

Tracheloplasty, a New Operation for the Relief of Sterility Due to Stenosis of the Cervix Uteri. EDWARD A. SCHUMANN, Philadelphia. *American Journal of Obstetrics,* October, 1914.

Schumann has devised an operation by which a tongue of vaginal mucous membrane is laid into a wedge cut into the posterior cervical wall. Thus flat squamous epithelium covers the cervical wall which cannot become hyperplastic and occlude the canal. In from five to seven days after the vaginal strip has healed into its new position, it is released from the vagina.

Scopolamine-Narcophin Seminarcosis in Labor. JAMES A. HARRAR and ROSS MCPHERSON, New York. *American Journal of Obstetrics,* October, 1914. *The Use of Scopolamine in Obstetrics.* A. J. RONGY, New York. *American Journal of Obstetrics,* October, 1914.

Both these papers report about the same results in an almost equal number of cases. Between 70 and 80 per cent. of the trials are successful, the number of forceps cases is a trifle greater than without the use of this narcotic, the asphyxiated and partially asphyxiated babies about the same in number with or without the use of scopolamine. The second stage of labor is apt to be somewhat prolonged, these authors find. While pain is diminished, it is not entirely absent, but amnesia is almost always present. Both mother and baby must be carefully and constantly watched during the entire labor.

The Surgical Treatment of Exophthalmos. C. H. MAYO. Rochester. *Journal American Medical Association,* October 3, 1914.

Mayo gives a brief account of the studies that have been made on exophthalmos in hyperthyroidism and refers to Landstrom's discovery of a previously undescribed microscopic muscle under the control of the sympathetic system which affords the most acceptable explanation of the development of exophthalmos. It has been noted since 1873 that irritation of the sympathetic ganglion caused dilation of the iris and some protrusion of the globe. Bénard has shown that irritation of the cervical sympathetic pushes forward the eyeball and Jaboulay in 1896 was the first to introduce an operation on the sympathetic ganglion for exophthalmic goiter. While a number of such operations have been performed, especially by Jonnesco, the relief in general is apparently about the same as that following

ligation of the vessels and the injection of boiling water into the gland. The operations on the thyroid, however, do not always relieve exophthalmos and the Jaboulay operation, that is, a cervical sympathectomy of the superior, and sometimes of the middle ganglion for the sole purpose of reducing exophthalmos and securing a slight ptosis of the upper lids, has been performed in the Mayo clinic in cases in which the nervous symptoms are excessive and the exophthalmos extreme. "This operation can be done with novocain as a local anesthetic, but is preferably made with a general or combined anesthetic. Incisions are made in the lines of the natural creases in the neck opposite the bifurcation of the carotid. The sternomastoid is drawn outward and a blunt dissection is made down to the jugular and carotid veins, which are then drawn inward. The posterior sheath of fascia inclosing these vessels is opened that the vagus nerve may be kept under observation, since this nerve is bulbous above this point and might be confused with the sympathetic. Under normal conditions the sympathetic ganglion is one-eighth to one-fourth of an inch wide. Many branches lead from it on either side. The connecting branches are divided, the upper part of the ganglion torn off or cut and lower portions of the nerve cut or torn at the middle ganglion unless the middle ganglion is also removed. The wound is closed without drainage." The result is very good in securing the relaxation of the eyeball and slight ptosis of the upper lid with great general improvement. The ease with which it is performed and the excellent results which frequently follow its employment render it worthy of consideration in cases of extreme exophthalmos. In some cases where the sympathetic does not seem to occur as a ganglion and with fewer and larger communicating branches, the results are not so good, the operation seeming to be incomplete. In cases in which the vessels of both upper poles were ligated in addition to the sympathectomy, the primary results were good, but it is too early to announce a permanent cure.

The Orbital Approach to the Cavernous Sinus. HARRIS PEYTON MOSHER. The Laryngoscope, 1914.

Mosher's plan is to gain access to the cavernous sinus through the inner half of the orbital plate of the great wing of the sphenoid. Such an operation was performed on a patient after experiments on the cadaver, but the man died in a few days. An autopsy proved that the cavernous sinus had not been entered. The writer then began a series of investigations on the cadaver which resulted in his perfecting the following operation: The globe of the eye is removed and the orbit cleaned out. Then the ophthalmic artery is tied. The groove in which the superior maxillary nerve runs is found and the periosteum is then separated from the orbital surface of the great wing of the sphenoid. The opening is made with a chisel from the notch for the superior maxillary nerve to the outer end of the sphenoidal fissure. The opening is enlarged outward. The dura is then elevated, the sinus is exposed and a blunt-pointed knife is inserted, and carried forward until it is stopped by the sphenoid bone. Through this opening a small curette may be carried backward through the whole sinus.

Advances in the Treatment of Gonorrhea. S. W. MOORHEAD, Philadelphia. *The Therapeutic Gazette*, October 15, 1914.

Moorhead advocates the use of the abortive treatment in cases seen early, as advocated by Ballenger—the sealing of a freshly prepared 5 per cent solution of argyrol in the urethra by means of collodion. This is repeated daily for five days, when in a large percentage of cases the disease will be found cured. In chronic gonorrhea the use of electrically heated sounds retained for thirty to sixty minutes at a temperature of 120° F. is recommended; also the use of the galvanic current to carry ions of silver, zinc or copper into the periurethral tissues. In cases seen too late to attempt the abortive treatment, 5 per cent argyrol or ½ per cent protargol hand injections four times daily, to be retained for five minutes, are advised. After the gonococci have disappeared, one per cent zinc sulphate should be used.

The Surgical Treatment of Nephroptosis by Occlusion of the Perinephric Fascial Sac. (Capsular Occlusion). C. B. LOCKWOOD, London. *British Medical Journal*, October 3, 1914.

Lockwood criticizes the conventional operations for anchoring movable kidneys upon two grounds. 1. The very frequent recurrences. 2. Because they interfere with the normal mobility of the kidney. Lockwood believes that the normal mobility of the kidneys has an important influence upon their function. He then describes the anatomy of the perinephric fascial sac and shows that in nephroptosis the kidney prolapses, not because of dislocation of this sac, but because the sac has become too capacious. Based upon this principle, Lockwood has devised an operation in which the perinephric sac is shortened at its lower pole by appropriately placed sutures, permitting the kidney to remain in its normal position and at the same time retaining its mobility. Lockwood reports four cases in which the operation proved successful.

Experimental Studies Upon Extirpation of the Lung. (*Experimentille Studien ueber die Lungenexstirpation.*) K. KAWAMURA, Japan. *Deutsche Zeitschrift fuer Chirurgie*, Vol. 131, Parts 3 and 4.

The results of various methods of pneumectomy were analyzed and the final outcome determined, in a very interesting series of operations upon dogs. It was shown that the animals thrive indefinitely after removal of one lung, and even after amputation of part of the remaining lung. Young animals grow in an approximately normal manner after extirpation of one lung.

At the operation the chief difficulty lies in the closure of the bronchial stump. Willy Meyer's method (crushing, and inversion by several tiers of sutures) was found the most reliable, but cannot be applied when the main bronchus is short or in small animals. Kawamura reports satisfactory results in many cases in which he divided the pulmonary hilus between clamps, ligated the vessels and bronchi by sutures passed through their walls, and made a careful continuous suture of the chest-wall.

The positive pressure apparatus used at the operations was found more satisfactory than the negative pressure ones. There were no instances in which fluid collected in the thorax after removal of the lung. The remaining lung is already increased in size at the end of the operation. The increase reaches its maximum in thirty to sixty days after pneumectomy. The gap left by the removal of the lung is filled in, in the above mentioned time, by enlargement of the remaining lung, the displacement of the heart and diaphragm, elevation of the diaphragm, the sinking of the upper thoracic aperture and lateral chest wall. Pronounced scoliosis with convexity towards the operated side develops regularly.

The microscopic changes in the remaining lung were of considerable interest. Soon after the operation the picture was that of acute vesicular emphysema; this changed gradually to one of "vicarious" emphysema. Although hyperplasia of the lung was never observed, a true compensatory hypertrophy developed regularly. The vessels of the lung, at first dilated, subsequently proliferate.

All of Kawamura's observations indicate the feasibility of pneumectomy, from the viewpoints of technic and ultimate outlook.

A Study of Tuberculous Lesions in Infants and Young Children, Based on Post-Mortem Examinations. MARTHA WOLLSTEIN and FREDERICK H. BARTLETT. *American Journal of Diseases of Children*, November, 1914.

In 1320 post-mortem examinations made at the Babies' Hospital of New York City, 178 cases showed tuberculous lesions. In a very careful analysis of these latter cases the authors come to the following conclusions:

The largest number were of inhalation origin, as shown by the large percentage of cases in which the pulmonary lesions were the most advanced in the body. The absence of tuberculous lesions from the lungs in fourteen cases and the presence of tubercular lesions in the bronchial nodes in seven of these seems to show that it is pos-

sible for the tubercle bacillus to pass through the lungs without localizing there. The marked tendency to rapid and general dissemination of the tuberculous lesions throughout the body in infants less than a year old is well shown. The survival of any young infant infected with tuberculosis for more than six months is very remote, while healing of tuberculous lesions in young infants is practically out of the question. In the entire series not a single healed tuberculous lesion was encountered, and attempts at healing, shown by calcified areas, were found only five times in the lung and thirteen times in lymph-nodes. Encapsulation of tuberculous lesions was not encountered in this series of cases, nor was congenital tuberculosis found.

Non-Operative Treatment of Tuberculous Glands of the Neck. R. T. MORRIS, New York. *New York Medical Journal,* October 3, 1914.

Morris concludes his paper with the following significant sentence: "Previous to ten years ago I operated many times in the course of the year for the removal of tuberculous glands of the neck, but during the past ten years I have not operated once for non-suppurating glands." The only indication, according to Morris, is incision and drainage of suppurating glands. Of non-operative methods Morris recommends the following: 1. Injection of seven per cent solution of iodoform in oil. From one to three minims are injected into each one of the glands at a sitting, at intervals of three or four days. 2. Active hyperemia induced by the alternate application of hot and iced applications to the neck. 3. High frequency current or *x*-ray. 4. Tuberculin. Morris has seen marked benefit from all four methods.

Osteoplastic Closure of the Trifacial Foramina. A. B. KANAVEL, Chicago. *Journal American Medical Association,* October 10, 1914.

Kanavel reports an experimental study of osteoplastic closure of the trifacial foramina. The experiments were made on dogs and three methods were tried: (a) Avulsion of the nerve with curettage of the canal, breaking down of the foramen and covering the area as well as possible by pedicle-flap of adjacent periosteum. (b) Avulsion of the nerve, curettage of the canal and a transplant of periosteum from some other part of the body. (c) Avulsion of the nerve, curettage of the canal, and a transplant of bone to fill the canal. These methods are illustrated. In avulsing the nerve it was found that the best results were obtained by grasping the nerve firmly and twisting very slowly so that from five to ten minutes were consumed in the procedure. Detailed reports of the experiments are not given though they were kept. In series A, with covering the canal with pedicle periosteum flap, the experiments were uniformly successful in obliterating the canal if the work was thoroughly done. There was some difficulty in preserving the adjacent periosteum in good condition for the flap. In the second group, B, the results were not nearly so successful, the nerve growing through in the majority of cases. In the third group with avulsion of the nerve and transplant of bone to fill the foramen the experiments were successful excepting when infection occurred, which was rather common on account of the locality of the wound in the mouth. When successful the complete bony closure followed. These results, Kanavel says, may find practical application in various conditions, but primarily as a palliative measure in the treatment of trifacial neuralgia when other measures fail to give relief. It would not be indicated when a ganglion extirpation according to Frazier and Spiller can be done with safety or where alcohol injections give considerable relief for a long time. He reports a case of the practical application of the method in which he operated on the infra-orbital and dental branches of the fifth nerve with good results. He warns against extending an infra-orbital incision too near the nose and thus endangering the lacrymal sac and also against injuring the facial nerve when retracting the muscle at the angle of the jaw in the lower operation. The infra-orbital foramen was plugged in his patient with a bit of the tibia with periosteum attached. In the lower operation on the dental nerve a crucial incision was made in the periosteum under the angle of the jaw over the area of the nerve and a small button taken out with the trephine down to the medulla. The canal was then curetted and the button replaced, but rotated so that the destroyed canal was at right angles to the canal of the bone. He presents this paper as an experimental and clinical study, but does not advocate the operation until he and others have had further experience with it.

Muscle Bound Feet. RUSSEL A. HIBBS, New York. *New York Medical Journal,* October 24, 1914.

By "muscle bound feet" Hibbs refers to a rather common malady, in which the patient is prevented from walking long distances because of incomplete flexion of the foot. Normal flexion is obtainable up to 70° or 80°, but in these patients only 90° is possible. The condition, Hibbs says, is due to shortening of the posterior leg muscles, and is associated with a great variety of symptoms. The patient is easily tired upon walking, the feet are painful, the gait is inflexible, some have backache, and others have Martin's metatarsalgia. In addition, these patients are frequently of the nervous type. In addition to the physical sign mentioned above, there may be lateral deformity (abduction), flat feet, and a poor circulation as evidenced by cold and clammy feet. To cure the condition, Hibbs recommends incision of the sheath of the tendo Achilles, lengthening of the tendon to the sufficient requirement, and closure of the sheath. Hibbs has found this operation curative in 38 cases.

Extension of the Calcaneus. (*Die Drahtextension am Calcaneus.*) E. GELINSKY, Berlin. *Zentralblatt für Chirurgie,* August 22, 1914.

Steinmann's original communication upon his method of obtaining extension in fractures of the femur advocated perforation of the condyles of the femur. Klapp modified this method by suggesting that the calcaneus be employed for this purpose. Now Gelinsky suggests that the attachment of the tendo Achilles is the best method, because it does away with the perforation of bone and its possible consequences; furthermore it is far more feasible.

On an Unfamiliar Action of the X-ray and its Therapeutic Value. (*Ueber eine unbekannte Wirkung der Röntgenstrahlen und ihre Therapeutische Verwertung.*) H. ECKSTEIN, Berlin. *Berliner Klinische Wochenschrift,* September 7, 1914.

Having noticed upon his own person that the *x*-ray had a marked effect in relieving pain after an injury, Eckstein has since applied the *x*-ray to many cases of localized pain throughout the body. He has used it in contusions, fractures, dislocations, inflammatory swellings of the joints, and finds that one or more applications usually suffice to relieve pain. Eckstein applies it through a hard or medium hard tube, with 0.4 or 0.2 milliampere current at a distance of 15 to 30 cm. for two to seven minutes. At first no filter is used; later he uses an aluminum or lead filter.

Transfusion—Direct and Indirect. Simplified Methods. B. M. BERNHEIM and A. P. JONES, Baltimore. *Southern Medical Journal,* November, 1914.

The authors describe Kimpton's glass cylinder method and Lindeman's syringe method of blood transfusion and then compare these with their own method of direct transfusion by means of a canula. They claim that the latter has distinct advantages over the indirect methods, in that first it needs less special apparatus and second the transfusion can be interrupted and again started if necessary. They describe a case in which a sudden hemorrhage occurred from an intestinal ulcer. A transfusion was started and continued until the patient was ready for a gastro-enterostomy. During the latter operation the canulae were left in both the donor's and recipient's vessels. During the enterostomy the patient's condition became bad and it was possible to relieve him at once by means of a continuation of the transfusion.

The authors advocate strongly the use of blood-pressure readings in order to determine how much blood has passed to the recipient.

Cancer of the Tongue, Based Upon the Study of One Hundred Cases. Jos. C. BLOODGOOD, Baltimore. *Canadian Journal of Medicine and Surgery*, September, 1914.

This study has led to some remarkable conclusions. It has been demonstrated that the failure to cure when cancer of the tongue is fully developed is due chiefly to the neglect to remove the muscles of the floor of the mouth below the cancer. The high mortality after the operation is chiefly due to the removal of the floor of the mouth without removing at the same time a section of the lower jaw. If operated on very early, it is sufficient to remove the growth with a good margin of healthy tissue. In such cases there are almost 100 per cent of recoveries.

The author proceeds as follows: The glands of the neck are first removed and, after the operation, their connection with the floor of the mouth below the lesion is thoroughly burned with the cautery and the wound closed. Then the lesion in the tongue or floor of the mouth is attacked with the electro-cautery. The application of this is usually repeated two or more times, until everything is destroyed down to the area of the first cauterization from below. The healed skin flap of the first operation forms the floor of the mouth and prevents an oral fistula. In the author's most recent cases the operation has been done in three stages. When the author considers the cases (fourteen in all) personally operated on by him by these new methods in the past five years, he finds that there has been no post-operative mortality and so far but one patient is dead of recurrent carcinoma. When 86 other cases operated upon by methods previously used are considered, the advantage of the new technic is apparent, for formerly there was a post-operative mortality of 22 per cent. Bloodgood concludes as follows: "We have, therefore, apparently conquered the technic of operations for cancer of the tongue. Now, if we can educate men to come earlier, we shall probably conquer the disease."

Gastric Cancer in the Young. A Study of Sixteen Instances in Patients Under the Age of Thirty-one. FRANK SMITHIES, Chicago. *Journal of the American Medical Association*, November 21, 1914.

With an analysis of sixteen cases of gastric cancer in patients under the age of 31, Smithies reviews the statistics derived elsewhere and the recognized types of the disease. Six instances, some of them dubious, have been recorded in patients below the age of 10. In the second decade thirteen cases have been reported, but in five of these there were no reliable pathologic reports. In the thirteen cases in the third decade there were also a few, but in a few of these there was a seemingly malignant gastric disease. In his total group of 721 pathologically demonstrated gastric cancers from the Mayo Clinic and the Augustana Hospital, Chicago, the percentage of youthful cases was 2.2. There were nine females and seven males; the youngest aged 18, the oldest 30; the average age 27.8 years. In 12 per cent of the thirteen there was a family history of cancer. Apparently occupation was not a causal factor. Two types of histories are noted, the first including cases of a pernicious gastric affection of progressive course appeared with no preceding stomach ailment. In the second group there was a previous history of gastric complaints conforming to the type usually called peptic ulcer. Two of the sixteen cases fall into the first class and the average duration was 4.5 months. In the other fourteen the patients had been affected for an average of 4.8 years with some gastric malfunction which in its early stages had been roughly classed as dyspepsia. In five of the cases the syndrome was that of gastric ulcer. In four cases the so-called ulcer features were definite in some stage in the early period and in four other cases the symptoms were those of ulcer of an irregular type. In their remaining case there had been gall-stone attacks for four years and stones were found on laparotomy. The later stage of all in group two was typical of gastric malignancy. This period averaged 7.8 months, the shortest three weeks, the longest nearly three years. The malignant course in this group took nearly half again as much time on the average as that in group one. In six instances the appetite was poor and constipation was the rule in all. In the malignant stage there was marked loss of weight, in the early part of the disease, intermittent. Some degree of pain was noted in all cases, in two instances suggesting perforation. In the two cases of the first group it was never severe, but was continuous and generally aggravated by food and drink. In the other fourteen it came in spells or attacks in twelve. In seven instances it had a fairly definite relation to indigestion; in four instances, even after malignancy was shown, the food relief of pain persisted, but in ten it changed to food aggravation of pain. There was abdominal tenderness in all and tumor was palpated in six cases of the entire series. Eructations and pyrosis were commonly noted, and vomiting at some time in the course of the disease. Hemoglobin estimation in some cases averaged 66 per cent; and in ten blood was chemically demonstrated in the stools. In fifteen cases important facts were demonstrated by test-meals. Gastric motility was affected in eleven and dilatation of the stomach had occurred. Achylia appeared in none and free hydrochloric acid was absent in but one instance. Combined hydrochloric and acid salts averaged 18.1, ranging from 0 to 50. Lactic acid was demonstrated in six cases and altered blood chemically shown in gastric contents twelve times. The Boas-Oppler bacillus was recognized six times and yeasts and sarcinae were present in eight. The laparotomy findings showed the pylorus involved in five, the lesser curvature and some part of the gastric surface in nine; infiltration of the cardia in one and one case of general carcinosis. Lymph-nodes had been invaded in fourteen and secondary growth demonstrated in other organs in nine. In eight, medullary cancerous ulcers were present. In the others, adenocarcinoma of the common type. In five cases some form of resection was performed; in seven drainage operations to fit the case, and in four only exploration was possible. Nine patients died within one and one-quarter years following operation. To the other patients a lease of life from two to more than five years was granted. A tabulated summary of the cases accompanies the paper.

Bacteriology of Cholecystitis and Its Production by Injection of Streptococci. E. C. ROSENOW, Chicago. *Journal of the American Medical Association*, November 21, 1914.

Little attention has been given heretofore to the bacteriology of the tissues of the gall-bladder wall in cholecystitis. He gives an account of the bacteriologic findings in a case and of experimental work on producing cholecystitis in animals. The strains of streptococci producing cholecystitis are strikingly similar and resemble those from ulcers of the stomach. The lesions most commonly observed other than cholecystitis, when these streptococci are injected, especially in rabbits, are an ulcer of the stomach, hepatitis about the gall-bladder myositis, and myocarditis, arthritis, appendicitis, and colitis. He says: "The common presence of streptococci in the wall of the infected gall-bladder and in the center of gall-stones, often in pure culture, while absent from the bile, and their affinity for the gall-bladder in animals, are strong evidence that streptococci are the cause of cholecystitis in man far more frequently than is believed, and serves to explain the good results reported by some as following cholecystectomy in cases of myocarditis, arthritis, and other conditions."

The Surgical Treatment of Pericystitis. EUGENE FULLER, New York. *Medical Record*, October 3, 1914.

In the operation of seminal vesiculatomy, performed for the relief of the usual symptoms, mainly sexual, Fuller noted that the cystitis, which is frequently associated with such symptoms, cleared up after the operation. This led to cystoscopic examination of such bladders, and he found that the cystitis was confined to the base of the organ, in fact to that part of the bladder lying over the seminal vesicles. Fuller classifies these inflammations, therefore, as pericystitis. Further experience has shown Fuller that these inflammations are sometimes very extensive and occupy nearly the entire bladder mucosa. The important point that Fuller emphasizes is that the usual treatment of cystitis, viz., irrigations, drainage, etc., do no good in these cases; indeed they may even do harm. The only rational and effective treatment is seminal vesiculatomy. Fuller reports in detail three illustrated cases.

American Journal of Surgery

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[American Journal of Anesthesia and Analgesia]

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THE TECHNIC OF SPINAL ANESTHESIA.*

By W. WAYNE BABCOCK, M.D., F.A.C.S.,
Professor of Surgery in the Medical Department of Temple University; Surgeon to the Samaritan Hospital,
PHILADELPHIA.

The introduction of a local anesthetic within the dura is followed by a more or less complete arrest of conduction in those spinal nerve roots that come in contact with the solution. If the solution is sufficiently concentrated there is complete arrest of motor, sensory and sympathetic conduction of the segments affected. The effect upon the cord proper is relatively slight and it is often possible under high spinal anesthesia to demonstrate evidences of conduction along the paths of the cord. With weak anesthetic solutions sensory conduction may be arrested with but imperfect loss of motor or sympathetic conduction, while very weak solutions may cause only an imperfect analgesia. As would be expected, the loss of protopathic or pain sense involves a wider area and is more intense than the loss of epicritic or touch sense. Patients may, therefore, feel the knife, although it does not hurt them, or they may complain that alcohol burns the skin, although they do not recognize the incision of tissues. The duration of intradural anesthesia is influenced by the dosage and concentration of the drug employed and varies from twelve minutes to two hours. One to one and one-half hours is the average duration for the adult.

The most effective percentage strengths for intradural use we have found to be 4 per cent. for stovaine, 4 or 5 per cent. for tropacocaine, and 7 or 8 per cent. for novocaine. The weaker solutions give too light and transient an anesthesia and tend to become too widely diffused, while the stronger solutions are so concentrated as to diffuse imperfectly, limiting their area of action and at times increasing their danger. To secure efficiency when using a strong solution, the operator may be tempted to increase the dosage. For example, Jonnesco, who uses a 10 per cent. solution for lower spinal work, advocates nearly twice what we consider a normal dosage. Five or six centigrams of stovaine in 4 per cent solution will give an analgesia that lasts about ninety minutes; two or three centigrams of stovaine in 4 per cent. solution will produce an analgesia that lasts about fifteen or twenty minutes. It follows that in very young children, for whom only small doses may be given, prolonged operations are not conveniently done under spinal anesthesia.

*Read during the Second Meeting of the American Association of Anesthetists, at Atlantic City, June 22, 1914.

Spinal anesthesia acts with great rapidity, the analgesia appearing within a few seconds after the injection and being rapidly followed by loss of motor power and muscular sense. With the average adult dose the analgesia reaches its intensity about fifteen minutes after the injection, and then gradually fades. First the motor loss and muscular sense gradually return, the sympathetic regains its tone, the area of epicritic loss becomes gradually reduced, and finally the area of protopathic arrest disappears. The effect is tide-like, the influence gradually spreading upward along the cord until the highest nerve roots in the effective range of diffusion of the drug are affected, and then the wave of analgesia recedes. This tide, which washes upwards and then returns, is not so clearly noticeable in a downward direction, although when a small dose of the analgesic has been injected near the upper part of the cord, there may be observed waves of analgesia passing simultaneously upward and downward, to reach their intensity and widest limits, and then gradually recede toward the segments close to the point of injection. As the analgesic wave diffuses upward the strength of the drug is weakened by the diluting cerebro-spinal fluid. For this reason the nerve roots near the apex of the wave are more lightly and transiently affected than the nerve roots first washed by the injection.

For prolonged and complete analgesia it is desirable, therefore, to make the injection if feasible into the dura through an interspace adjacent to the nerve roots that supply the field of operation. Thus for operations upon the perineum or anus the injection is especially effective if made through the third or fourth lumbar interspace; for operations upon the leg, through the second lumbar interspace; for the lower abdomen or groin, through the first lumbar interspace; while for operations upon the stomach, gall bladder or liver, the injection is most effective when given through the eleventh or twelfth dorsal interspace. With a minimum dose injected through the twelfth dorsal interspace, although the anagesia may be sufficient for upper abdominal work, it may be transient and patchy for operations upon the legs or perineum. It is obvious that the operator who injects the solution through the fourth lumbar interspace and then attempts to do a gastro-enterostomy, will condemn the anesthetic as ineffective and unreliable, as may also the operator who attempts an operation upon the toes after injecting a small quantity of the analgesic in the twelfth dorsal interspace.

The injection of weak solutions in the lower part

of the cerebro-spinal canal is relatively safe, for as they diffuse upward toward the phrenic nerve roots of the cervical region they are so weakened as to have little effect. Weak solutions injected in the middle or upper dorsal region or in the cervical region are, however, dangerous, as they interfere with the innervation of the muscles of respiration. Strong solutions of high specific gravity injected in the lower part of the arachnoid cavity may be dangerous by upward gravitation unless watchful care is taken not to elevate the pelvis until a sufficient time has elapsed to permit the absorption of the bulk of the drug. It should be evident, therefore, that for successful spinal anesthesia the operator should not only understand clearly the physiologic action, but should understand the dosage and the interspace most suited for the special operation to be performed. The operator should also realize the transient nature of spinal analgesia and should be prepared promptly to start the operation after the injection; otherwise valuable time may be lost and the patient may emerge from the influence before the operation has been completed. Although spinal anesthesia is relatively safe and very effective when used skilfully, it is an exceedingly dangerous and unreliable anesthetic in the hands of those who do not understand its action.

SOLUTIONS EMPLOYED.

My associates at the Samaritan Hospital and myself have now operated under spinal anesthesia over 6,000 times.

Personally, we prefer solutions in ampules, on account of their convenience, accuracy, known specific gravity and greater assurance of sterility. In any case the preparation should, as far as is possible, be of unquestioned reliability. Unfortunately this is not always assured, and we have found living micro-organisms in solutions upon the market.

One of the problems in spinal anesthesia has been to produce a sufficiently high effect for upper abdominal work. This may be accomplished, first, by selecting a high interspace for the injection; second, by withdrawing a considerable quantity, 5 to 15 c.c., of cerebro-spinal fluid, adding the drug and reinjecting or injecting a corresponding quantity of the analgesic in weak solution; third, by employing gravity to retain the solution in contact with the selected nerve roots. This latter method is based upon the fact that any solution introduced within the cavity of the arachnoid rises or falls according as its specific gravity is heavier or lighter than that of the cerebro-spinal fluids. By adding glucose, milk sugar or mannitol the specific gravity of the solution may be increased, and by giving the injection of such a heavy solution with the patient upon his side, his shoulders and hips elevated, and then cautiously rolling the patient on his back while still maintaining the elevation of the hips and pelvis, the heavy solution remains in the most dependent portion of the dural cavity, the lower dorsal region. This is the method elaborated by Barker. As it is frequently desirable to operate with the patient in the Trendelenburg posture, or to lower the head of the patient for circulatory depression, I have for several years chiefly used a solution lighter than that of the cerebro-spinal fluid.

Cerebro-spinal fluid has a specific gravity of about 1.0055. The addition of a 10 per cent. absolute alcohol to a 4 per cent. solution of stovain reduces its specific gravity to about 0.992. This light solution ascends in cerebro-spinal fluid with a speed somewhat approximating 10 centimeters per minute. Stovain has the property of alkaloids of being precipitated by alkalies, and therefore a minute quantity of lactic acid is added to the solution to retard precipitation by the alkaline cerebro-spinal fluid. In case it is desirable to elevate the head and shoulders of the patient during the operation, a solution made heavy by the addition of 5 per cent. of milk sugar is employed. The following are the formulas that we have found useful:

Light Solutions.

A. Stovain	0.08	gm.
Lactic Acid	0.04	c.c.
Absolute Alcohol	0.2	c.c.
Distilled Water	1.8	c.c.
B. Tropacocain	0.1	gm.
Absolute Alcohol	0.2	c.c.
Distilled Water	1.8	c.c.
C. Novocain	1.16	gm.
Absolute Alcohol	0.2	c.c.
Distilled Water	1.8	c.c.

Heavy Solution.

D. Stovain	0.08	gm.
Lactic Acid	0.4	c.c.
Milk Sugar	0.10	c.c.
Distilled Water to make	2	c.c.

The solutions are kept in sealed ampules each containing 2 c.c. of the solution. They should be prepared under aseptic precautions and sterilized by the intermittent method at a temperature about 65° C. Although manufacturers sometimes contend that these substances withstand the temperature of boiling water with impunity, we have found boiled solutions objectionable. The dose for the adult of each solution is from one to one and one-half c.c. Novocain is the weakest of the anesthetics, is not precipitated by the cerebro-spinal fluid, and does not hemolyse blood. It does not produce as satisfactory a loss of epicritic sense and motor power as solution A, which at the present time we prefer.

Solutions extemporized from powders or tablets I have abandoned from fear of bacterial contamination.

SELECTION OF THE PATIENT.

We have employed spinal anesthesia in patients of all ages, from the new born to those of advanced life. It may frequently be employed where ether is inadmissible or has produced dangerous symptoms. Probably no anesthetic gives as great a degree of muscular relaxation with as little danger as spinal anesthesia. As a rule, patients who have a marked hypotension of the circulatory system, or those in whom a marked reduction of vasomotor pressure would be dangerous, should not have spinal anesthesia. Should it be administered to such a person a cannula should be tied in a vein of the arm connected with a funnel of salt solution before the intradural injection, and any dangerous fall of blood pressure counteracted by the cautious intravenous introduction of the salt solution containing adrenalin. By this expedient, I was enabled to successfully carry a patient, at the beginning pulseless and apparently moribund from a ruptured uterus, through a Porro operation. A patient pulseless or nearly pulseless from traumatic shock should not, as a rule, be given spinal anesthesia until reaction has occurred. Patients with advanced peritonitis, with great abdominal distension and cyanotic extremities, are not good subjects for spinal anesthesia; especially is this true of the middle-aged obese patient. Patients in collapse from traumatic ileus do not well withstand the hypotension of spinal anesthesia. Patients with advanced septic disease of the biliary system and associated marked myocardial weakness are also bad subjects. The method is contraindicated in patients greatly depressed and toxic or with mechanical limitation of respiratory space, as from large pleural effusions or pus or serum, or massive intrathoracic growths. In patients in collapse from hemorrhage, the intradural injection should be made with great caution. Obese patients with short, thick chests and limited breathing apparatus are less favorable than patients with large respiratory mechanisms. Those very depressed patients who may be carried through an operation by local anesthesia or a few whiffs of ether should not be given the intradural injection. Patients with large fibroid tumors and myocardial degeneration should be given the injection with great caution. The aged and debilitated should be given relatively small doses. Young or middle aged adults of the robust type, patients with the hypertension of renal disease or eclampsia are good subjects for the injection. Children withstand relatively large doses. Thus 1½ ctgm. of stovain may be given to the new born; 3 ctgm. to a child of five; 4 ctgm. to a child of ten. The proportionate size and robustness of the child are more important than the exact age.

PRELIMINARY NARCOTISM.

The retention of consciousness within the operating room is often objectionable, and in many instances this may be obviated by the preliminary injection of narcotics. We have employed morphine and scopolamine chiefly. For a robust adult 1/6 of a grain of morphine sulphate with 1/100 of a grain of scopolamine or hyoscin hydrobromide is given by hypodermatic injection about seventy-five minutes before the time of operation. If in twenty minutes the patient answers questions without evidence of mental confusion the injection is repeated; while for certain very robust and resistant patients a third injection of morphine either alone or combined with a 1/15 of a grain of apomorphine if the delirifacient action of the scopolamine predominates, or of both morphine and scopolamine if the previous injections have produced little effect, is given. These injections should be given at intervals of about twenty minutes and should be used with great caution or avoided in the debilitated, toxic or aged patient. In patients under thirty the delirifacient action of hyoscin or scopolamine often predominates and is objectionable. In these patients the initial dose of morphine may be 1/4 grain in combination with 1/50 of a grain of atropine. In children narcotics are rarely required. After the intradural injection, if properly reassured the child usually quickly adjusts himself to the environment of the operating room, and when convinced that the numbness and loss of power of the legs are quite proper, the little patient often will fall asleep during the operation. Narcotics intensify and by reducing epicritic sense increase the duration of spinal analgesia. When properly used they enable the patient to pass through the operation oblivious of the fact that he has been removed from his bed, and often strongly protesting on awakening that he has not been operated upon or even been alseep.

While narcotics render the patient oblivious of the operation, they increase the danger of spinal anesthesia or of any other anesthetic that may be administered, as they depress the centers of the central nervous system, suppress certain metabolic processes and produce undesirable, although often transient, alterations in the parenchymatous organs. In the asthenic, shocked, debilitated or aged patient they should be used with the greatest care or

avoided. Preceding or during spinal anesthesia consciousness may also be dulled by the administration of ether or other anesthetic by inhalation.

ASSOCIATED LOCAL ANESTHESIA.

Local anesthesia is at times of value in association with spinal anesthesia to extend the incision above the level of the analgesia or to prolong the intradural effect which may partly pass off before the operation has been completed. Likewise, it very extensive amputations, it is desirable to employ Crile's method of nerve blocking in association with the spinal analgesia.

AFTER TREATMENT.

Immediately after the operation patients who have received narcotic injections usually are given a large enema. Two quarts of warm water to which may be added 2 ounces of glucose and 3 drachms of sodium bicarbonate are slowly run into the bowel, and each fourth hour thereafter for the first twenty-four or forty-eight hours the patient receives from 4 to 8 ounces of fluid by rectum. If the narcosis is too prolonged or intense, there is incorporated into the first enema a pint of black coffee and 2 drachms of tincture of capsicum. The deeply narcotised patient must constantly be watched until awake and if there is any evidence of cyanosis or of obstruction in the upper air passages, the tongue and lower jaw must be held forward in such a manner as to give a free air way. In several instances death from suffocation has resulted from failure to observe this rule in patients comatose from scopolamine morphine.

METHOD OF INJECTION.

Before being brought to the operating room the back of the patient is scrubbed with acetone and painted with a 2½ per cent. tincture of iodine. A dry sterile binder is then applied. In the operating room the patient is seated across the operating table so that he sits well back from the edge of the table. The dressing is then removed and the back either flushed with alcohol or given a second coat of one-half strength tincture of iodine. The assistant observes that the patient sits squarely across the table, that the hips are even, that the elbows are parallel and at the sides of the patient, and that the forearms are crossed in front of the patient's body. Facing the patient he then stands on a low stool, holds the patient's hands with his right hand, while his left arm encircles the back of the patient's neck and his fist makes pressure against the patient's abdomen. The patient's chin is thus forced down upon his chest, the back is arched, but the patient should not be permitted to lean forward. The desired spinal interspace is now selected.

POINT OF INJECTION.

The point of injection for an abdominal operation should be approximately on a plane with the operative area. Thus for operations upon the stomach, liver or gall bladder, injections through the twelfth dorsal interspace give the best analgesia. For operations upon the lower half of the abdominal cavity, the first lumbar interspace; for operations upon the leg, the second or third lumbar interspace; for operations upon the perineum, the fourth lumbar interspace may be selected. Practically most of our operations have been done by injections through the first or second lumbar interspace with an occasional twelfth dorsal injection when it was desired to thoroughly anesthetize the upper abdomen. As a rule, the lower point of injection is safer, as the involvement of the upper dorsal nerve roots interferes with the respiration and increases the fall of blood pressure.

APPARATUS.

A syringe of 2 c.c. capacity of the Luer type is preferred. If properly made, the piston of such a syringe fits loosely enough to be forced out by the pressure of the intradural fluid. This is important as showing that the needle has properly entered the arachnoid. The Record syringe is rather heavy, and the piston does not move with sufficient ease. To insure delicacy of manipulation the needle should likewise be small and light. It should be of iridinized platinum or gold to avoid breakage; have a length of about 7 centimeters and a diameter of 1/10 centimeter. A well fitted stylet should be provided so that the needle cannot become clogged in the introduction. The syringe, needle and stylet should be wrapped in gauze and boiled just before using, in water free from alkali, for fifteen minutes. The apparatus should be brought to the operator while still boiling hot not only to insure sterility, but also to serve to warm the anesthetic solution. The assistant now wipes the surface of an ampule with a bit of gauze moistened with alcohol and breaks the ampule at its neck. The contents of the ampule are drawn into the syringe, and air bubbles and excess of solution expelled. For an adult, the syringe usually should now contain from 1.2 to 1.5 c.c. of the solution. The needle containing the stylet should be entered close to the midline at right angles to the body and about the middle of the interspace. It should be carried directly forward until it is felt to be grasped by the dense interspinous ligament. Only in the dorsal region it is necessary to tilt the needle somewhat upward. In the lumbar region the greatest success is obtained by entering the needle at right angles

to the surface of the body. Following this rule I have failed to enter the spinal cavity only once in over 4,000 personal cases, the failure being in the case of a kyphotic dwarf. If the patient shows a scoliosis do not enter the needle in the midline of the body, but along the midline of the spinous processes, and pass the needle directly forward instead of attempting to deviate it to the midline of the back. The grasp of the needle by the cartilaginous interspinous ligament usually indicates that the needle is passing in the proper direction. After penetrating the ligament the stylet is withdrawn and the needle pushed forward a few millimeters at a time. The hand notes the cessation of resistance as the needle passes through the interspinous ligament and enters the loose areolar space external to the dura, and finally the slight resistance succeeded by a snap, as if a drum head had been punctured, when the needle penetrates the dura. If the needle being rather dull does not immediately puncture the dura, it is given a partial rotation so that its edge may cut through the dura. As soon as the dura is entered, cerebro-spinal fluid should begin to drop from the needle. If it does not do so, the needle is cautiously rotated and slightly moved until there is a free flow of fluid. At times it is necessary to reintroduce the stylet, make a very cautious aspiration with the syringe or to seek another interspace. If there is much difficulty with the first attempt, it is usually best to try another interspace. At times, if the needle enters directly in the median line, the plexus of veins external to the dura will be punctured and a few drops of blood may flow from the needle. We have observed no evidence of harm from this injury, and the flow of blood is usually quickly succeeded by clear cerebro-spinal fluid. With the cerebro-spinal fluid running freely, *and only when it is running freely,* the charged syringe is affixed to the needle. The piston is first withdrawn a short distance to permit the cerebro-spinal fluid to enter and mix with the solution, as well as to again prove the proper introduction of the needle. If a thorough diffusion is desired a part of the solution is now injected, more cerebro-spinal fluid is withdrawn by the syringe, and this procedure repeated two or three times until the syringe is empty. The needle is now quickly withdrawn, and if a light solution has been used, the patient immediately laid upon the table, which is so tilted that the shoulders are 2 inches below the level of the hips. This is to prevent an undesirable upward diffusion of the drug. Not over twenty seconds should be consumed in the injection.

The pulse and respiration are now continuously watched, the latter by the movements of a wisp of cotton affixed to the end of the nose. If the patient is awake, diverting conversation is often desirable, and if not contraindicated by the operation small bits of ice or sips of water may be administered. If the patient is very weak an injection of 4 grains of caffeine and 1/15 of a grain of strychnine sulphate is given subcutaneously to anticipate any respiratory depression. A nearly pulseless patient should also have a needle, connected with a funnel containing physiologic salt solution, tied into a convenient vein. The salt solution is permitted to run into the vein from time to time as may seem to be indicated, and to each 6-ounce funnelful is added from 1 to 10 drops of adrenalin. The adrenalin must be used with caution and we do not add it unless the patient becomes pulseless at the wrist. The flow of adrenalin is also to be cut off by pinching the tube as soon as the pulse returns, for fear of an excessive action upon the heart. For weak patients, not sufficiently asthenic to require the intravenous use of adrenalized salt solution, the subcutaneous injection of one ampule of pituitrin at the onset of the operation may be of value. For nervous faintness, the inhalation of aromatic spirits of ammonia or a few drops of ether may be tried.

Should the patient show evidence of nausea, the head and shoulders are lowered to a greater degree by inclining the table. Should respirations become shallow or imperfect then artificial respiration by compression of the thorax must be resorted to. It should be continued if necessary for one hour or more, or until the patient is able to resume spontaneous respiration. If the patient be so obese or the intrathoracic condition so interferes as to prevent artificial respiration by compression of the thorax, then forced artificial respiration should be tried. In such an emergency we doubt the value of the Meltzer intra-tracheal method. The pulmotor, if quickly available, may be used. In a sudden emergency we can certify to the value of a full size tracheal tube and the direct rhythmic inflation of the lungs by the surgeon or assistant. Using a piece of drainage tube that is cut off square at the end, pressed over the opening of the tracheal tube, the surgeon inhales deeply and inflates the patient's chest by blowing through the rubber tube. Exhalation occurs when the tube is lifted from the external plate of the tracheal tube. The pressure of the inflation cannot be harmful for an adult, as it cannot exceed or indeed reach the pressure within the surgeon's chest. While this method involves

the dangers of a tracheotomy wound it may be quickly carried out with but few instruments.

AFTER TREATMENT.

No special after treatment is required. In over 6,000 punctures without an occlusive dressing none have shown any signs of infection, so that we consider the sealing or dressing of the point of puncture unnecessary. The head and shoulders should not be elevated until one hour has elapsed from the time of injecting a light solution. Secondary headaches should not occur, and when of the characteristic spinal type, that is when they are increased by raising the head from the pillow, are associated with some stiffness of the posterior muscles of the neck, they indicate the use of contaminated or decomposed solutions. Such solutions may not only cause intense headache, but also abducens palsy, and should be promptly discarded. We do not believe that abducens palsy follows the employment of pure solutions. The anesthetic does not contraindicate the prompt administration of water either during or after the operation, and such food is given as in the particular case seems best without regard to the fact that the patient has been anesthetized. Secondary nausea or vomiting should not occur as a result of spinal anesthesia, and the patient should have less post-operative pain, less headache, less backache and general discomfort than the patient who has received ether. Finally, it is to be emphasized that the novice should not attempt spinal anesthesia without carefully investigating the subject, and should only use the method upon robust patients until he acquires dexterity and familiarity with the technic.

2033 WALNUT STREET.

SOME CONSIDERATIONS ON THE NATURE OF SURGICAL SHOCK.*

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Before proceeding to a consideration of the nature of surgical shock, it will be well to point out some of the ambiguities and general obscurities of the word shock. I have been working with a very special kind of shock—the kind that comes when the spinal cord is completely cut across, or frozen, or deprived of its blood supply at a given level. The cutting or the freezing or the lack of blood completely blocks the conduction of nerve impulses past the frozen or cut or injured point. The same result may be accomplished through the growth of a sarcoma of the vertebral column.[1] There is a very definitely localized lesion, and the results are also definite.

If the complete transverse lesion of the cord occurs in the mid-dorsal region, we find a complete and permanent paralysis of all the skeletal muscles whose motor nerves arise below the level of the transection, together with a complete and permanent loss of sensation in all regions the sensory nerves from which enter the spinal cord below the level of the lesion. The blood pressure may be very low, or may closely approach the normal measurements, depending on whether the lesion is high up, at the level of the sixth or seventh cervical segment, or much lower down. The visceral symptoms are severe at first, but improve as time goes on.[2]

This kind of shock is called spinal shock, but it is a kind of shock with which you, as anesthetists, have very little to do. The kinds of shock with which you deal do not generally involve any destruction of tissues within the central nervous system. It follows from this that there are at least two different kinds of shock—the spinal shock and some other kind. Personally, I believe that there is more than one other kind.

One of the first investigators to recognize clearly this difference and to insist upon a distinction between the two kinds of shock was Professor W. T. Porter,[3] and many of the other clear conceptions of processes involved together with the accurate descriptions of conditions found, so far as they deal with the physical aspects of surgical shock, have come from Professor Porter and his pupils. Concerning the chemical phenomena in shock, important though they are, we will have but little to say at this time.

Let me show what I mean by the statement that there is more than one other kind of shock. A patient may have suffered from a severe crushing injury of a limb, but not have suffered any injury to the central nervous system directly, and he may not have suffered much hemorrhage. Yet there is a fall of blood pressure, a rapid pulse, and all the other features of the clinical picture of shock. This is certainly not the kind of shock with which I have been working, since all the ordinary reflexes of the skeletal muscles, or most of them, may be obtained from the various parts of the body. There is no complete blocking of conduction involving the whole area of cross section of any part of the spinal cord.

Again, in some of the specific infectious disease, the patient may suffer collapse toward the close of

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the disease. No mechanical injury has occurred, yet the picture is that of shock.

We should, then, be careful to tell the circumstances under which shock has arisen. To speak of a particular case as traumatic shock is not sufficiently definite, unless we specify whether or not the central nervous system has been injured directly. If the central nervous system has been injured, we may have the exact homologue of the laboratory condition known as spinal shock. Not all injuries to the central nervous system result in a complete blocking of all the paths below a certain region, so that the description is not sufficiently exact unless the nature and extent of the injury is specified. The man with a crushed leg may die from shock, and the teamster who has had his spinal cord crushed beneath a load of coal may recover, although certain of the manifestations of shock may be more severe in the teamster with the crushed spinal cord.

To the laboratory worker, certain clinical descriptive terms, such as traumatic shock, do not, therefore, convey any very definite idea either of the nature of the injury or of the condition of the patient. I shall not, therefore, attempt, in this paper, to follow the ordinary clinical terminology, and I trust you will pardon me if I speak of conditions rather than names.

Since in practically all cases of acute shock, low blood pressure is one of the physical signs, we may first look into the mechanism for maintaining blood pressure under normal conditions, using this as a type of reflex nervous mechanisms, and then point out some departures from the normal as they occur in shock.

The heart and blood vessels, both of which are under the control of the nervous system, are the principal agents in maintaining blood pressure under ordinary conditions. The vasomotor nerves vary the caliber of the arteries and arterioles, and the mean blood pressures tends to rise or to fall according to whether the vessels constrict or dilate. When the blood pressure tends to fall because of the dilation of the blood vessels, the heart beats faster, because of accelerator impulses sent out from the central system over the sympathetic nerve supply, and forces more blood through the vessels. When the vessels are constricted, the heart beats more slowly, in response to impulses passing out of it over the vagus. The rapid heart rate of a man who has just finished running is familiar to all of you. But the heart will not beat faster when the blood pressure falls, nor become slower when the blood pressure rises unless the sympathetic and the vagus nerves are uninjured and active. When these nerves are renderd inactive by cutting them across, the rate of the heart is unchanged when the blood pressure rises or falls.[4] Rabbits can no longer run distances after these cardiac nerves are cut, although there may be no lesion of the heart or of the blood vessels. The thing to remember is that the heart while in the animal body under constant physico-chemical conditions will not change its rate unless acted upon by nerve impulses coming from outside the heart. I insist upon this point at this time because of a slight misconception that may have arised in the past.[5] Only after its excision from the body will changes in pressure alone bring about changes in the heart rate, and the rate then increases with the pressure.

It is my belief that there are at least four mechanisms involved in the maintenance of blood pressure, namely, (1) the vasomotor nerves, whose common point or origin lies in the medulla oblongata; (2) the heart and its nerves—intrinsic, perhaps, as well as extrinsic; (3) the skeletal muscles; and (4) some property of the tissues of the vessel walls, possibly independent of the nervous system, in addition to those properties directly under nervous control.

These mechanisms for maintaining blood pressure are, however, dependent for the most part upon the central nervous system for their efficient and coördinated action. And, as Descartes long ago suggested with reference to coördination in general, the central nervous system here serves as the mechanism of coördination between the afferent impulses and the motor response. We must consider, then, the various structural or functional elements interposed between the starting point of the afferent impulses and the muscle or gland cell in which the response occurs.

At the outset of the discussion of the nervous mechanisms involved in the process of coördination, we may point out that there are two systems concerned: (1) the somatic system, sensory and motor, and (2) the visceral system, sensory and motor.

The somatic sensory nerves arise in the organs of general and special sensation, the eye, the ear, the skin, muscles, tendons, and joints. They convey information of the general happenings in the somatic or "body" part of the organism. Most of these impulses at some time or another arise into consciousness, although some of them undoubtedly pass directly through the lower levels of the nervous system without entering into the cerebrum.[6]

The somatic motor system is concerned with the movements of the skeletal or striated muscle.

The visceral sensory nerves arise in glandular structures and in smooth muscles throughout the visceral system. Some of them convey impulses which may enter into consciousness, but others do not. They constitute the afferent portion of the sympathetic or autonomic system.

By the autonomic system, Langley means not only all the sympathetic system but also certain fibers in some of the cranial nerves, such as the vagus, and sacral fibers in the nervi erigentes. It includes both afferent and efferent fibers.

The visceral motor nerves, as their name implies, convey afferent impulses from the central nervous system to the various structures comprised in the viscera—the heart and the blood vessels, the gastro-intestinal tract, all the glands and other similar structures containing smooth muscle fibers. They belong to the efferent portion of the autonomic or sympathetic nerovus system.

In the operation of any mechanism which involves the coördination of afferent and efferent impulses, there is first of all a receptor or nerve ending at the periphery which is sensitive to stimuli. This receptor may be a free ending of the nerve in the tissue or it may be a specialized ending which is particularly sensitive to one particular form of stimulus, such as light, or touch. Sherrington has defined a sense organ as a mechanism for lowering the threshold value of the stimulus. As a rule, the nerve endings are more sensitive to stimuli than the nerve trunks. There are (a) afferent nerves leading from the receptor to the central system; (b) the junction or synapse—perhaps many synapses in series, in the central nervous system itself between the terminations of the afferent neurone and the final efferent neurone; (c) the efferent fiber; (d) the terminations or end plates of the efferent fiber; and (e) the effectors—muscles, gland cells, or whatever else they may be. All of these things enter into the formation of a reflex arc in a higher animal. And as each of them has certain peculiar properties of its own, as evidenced by its reactions to drugs, or to other changes of conditions, we may consider each one separately.

The receptors and the afferent nerves may be anesthetized either partially or wholly, by cold, pressure, cocaine, and similar agents; or some of them may become unusually sensitive through inflammatory processes.

The synapses are affected by strychnine and other drugs, and by changes in the oxygen and carbon-dioxide content of the blood. The synapses also have the faculty of summation in a high degree (Stirling). A single stimulus applied to an afferent nerve may produce no effect, but if repeated sufficiently often, and for a sufficient time, the nerve impulse set up may become sufficiently intense to pass the synapse and produce an effect. The synapses are the most sensitive portion of the arc to the effects of prolonged lack of oxygen, as is shown by resuscitation experiments.[7]

Strychnine, up to a certain limit, increases the passability, or decreases the resistance, at the synapse. But even in small doses, it may increase the resistance or even block conduction for vasomotor impulses. This paralysis of the vasomotors may occur at a time when the passability of the synapses for reflexes of the skeletal muscles is but little increased,[8] and the paralysis of a previously injured region of the spinal cord, e.g., during or after recovery from anemia, for responses of the skeletal muscles as well as vasomotors, occurs at a time when the reflex response of the skeletal muscles through uninjured portions of the cord is still increased. The paralytic action of strychnine is manifested earlier after previous lack of oxygen than otherwise.[9]

The efferent nerve cells are excited by an increased concentration of carbon dioxide in the blood and asphyxial convulsions may result. The cells constituting the respiratory center in the medulla oblongata are particularly sensitive to slight changes of oxygen and carbon dioxide tension in the blood. It is the changes in the concentration of the hydrogen ions associated with these slight increases in carbon dioxide or decrease in oxygen which constitute the effectual stimulus for respiratory movements.[10]

The relation of the efferent nerves to the effectors, i.e., the muscle or gland cells, is not altogether a simple one. There is good reason for believing that there is a third element intervening between nerve fiber and the muscle or gland cell—the receptor substance of Langley. The three elements —the end of the nerve fiber, the receptor substance, and the muscle or gland cell—constitute what Elliott has called the myo-neural junction, and, according to Elliott,[11] it is upon this myo-neural junction between sympathetic nerve fibers and smooth muscle that adrenalin acts. Adrenalin does not act upon smooth muscle directly, since smooth muscle which is not innervated from the sympathetic system does not respond to its application. But smooth muscle which is innervated by the sympathetic system will respond to the application of adrenalin even after the nerves going to it have been divided and have degenerated.

The myo-neural junction between somatic nerve

and striated muscle is markedly affected by such drugs as curare, by certain toxins whose origin apparently is in the gastro-intestinal tract, by the waste products of metabolism, fatigue products, and other substances of like nature.

The synapses, particularly of certain regions of the central system, and the myo-neural junctions are the weak places in the reflex arc, and the places most commonly acted upon by foreign substances, toxins, or other adverse influences. The nerve fibers are, in general, more resistant than the nerve cells.[12] The Betz cells of the cerebral motor cortex may be inexcitable during ether narcosis, but the fibers of the pyramidal tract in the spinal cord may still be highly excitable. Nor are the synapses between the fibers of the pyramidal tract and the cells in the spinal cord about which they end affected to the same extent as the synapses in other regions, such as the cerebrum.

Afferent impulses over the visceral sensory nerves are not limited in their effects to reflex responses through the visceral motor system. Irritation within the stomach may lead to vomiting, and as will be shown a little later, vomiting involves the action of certain striated muscles. Similarly, afferent impulses over the somatic sensory nerves may bring about a reflex response which will involve the visceral motor system as well as the somatic. The mere sight of a disagreeable object may produce vomiting.

This community of relationshp between somatic sensory, somatic motor, visceral sensory, and visceral motor systems is an important one. Various kinds of afferent impulses may lead to the same general motor response. The various kinds of afferent impulses which may lead to vomiting illustrate this point. But no matter over what channels the different afferent impulses which lead to a particular motor reaction may pass, they eventually come to a definite group of cells somewhere in the central system, in which the motor or efferent impulses arise. From this point on, the path is the same, no matter what the nature of the afferent impulse may be. We have, therefore, the principle of the final common path (Sherrington) founded on facts of the general character which are here briefly indicated.

In addition to the reflex elements involved in the maintenance of blood pressure, there is evidence of the existence of an automatic elements, i.e., an element dependent upon the changes of blood pressure or blood constituents within the vasomotor center in the medulla oblongata.[13] This is analogous, though not so preponderant in its action, to the well-known automatic element in the respiratory mechanism, dependent upon the "blood-stimulus" for its normal operation. Evidence of such a sensitiveness to the "blood-stimulus" in the motor cells of the spinal cord has been recently adduced by Graham Brown.[14]

Such, then, is the nervous, muscular, and glandular mechanism involved in the circulation, and such are its strong and its weak points. Which of these are affected in shock, and how?

It requires but little reflection to see that the sympathetic—the viscero-sensory and viscero-motor system is the one primarily and most markedly affected in surgical shock. The patient may be fully conscious, and have voluntary control of the movements of the skeletal muscles. It is true that the movements may be sluggish, and that the skeletal muscles may be more flaccid than usual, but it is a question whether this may not be a secondary result of the low blood pressure and other disturbed metabolic conditions of the body as a whole, rather than a primary effect.

Nor would complete relaxation of the skeletal muscles, such as occurs after intravenous injection of curare, account for the great fall of blood pressure observed. The vascular system and the heart must then be responsible. It is commonly observed that the heart beats rapidly in such conditions. The heart itself, independently of its extrinsic nerves, never beats more rapidly when the blood pressure is low. The heart must, therefore, be receiving accelerator impulses over the sympathetic nerves during certain phases of shock.

The reflex mechanism for acceleration of the heart is not exhausted nor depressed, but, on the contrary, is more active than usual.

It has been shown also that many of the peripheral arteries are constricted and not dilated.[15] So far as these vessels go, there is again no exhaustion of the reflex or other mechanism for vaso-constriction, but even an increased activity. The question arises whether all the arteries in the body are similarly constricted, or whether some of them may be widely dilated. It is known, for example, that the peripheral blood vessels, and particularly the arterioles, constrict when the surface of the body is cooled, but the systemic blood pressure does not necessarily arise. Nor does the increased flow of blood to the surface when the external temperature is high necessarily entail a fall of pressure. There is either a compensatory change in the caliber of the deep blood vessels or a change in the heart rate, or both, by which the blood pressure is maintained at a nearly constant level. Porter,[16] how-

ever, has found that stimulation of an afferent nerve apparently affects all parts of the vasomotor system in much the same way, causing constriction of the splanchnic and peripheral vessels alike, or else dilation of all of them. Stewart's[17] studies on blood flow in disease are leading to the acquisition of data on this point, and clearly indicate that in certain disease processes at least, there is a difference in the distribution of the blood to various parts of the body, probably due to local changes in the caliber of the arteries.

It is known also that active muscles and glands receive more blood than when in the resting state. For the present, I believe that the assumption that all the arteries are constricted in surgical shock must remain purely an assumption until further evidence is adduced, either for or against it.

But if all the arteries are constricted, and the heart is beating rapidly, indicating no exhaustion of these mechanisms, some other part of the vasomotor system must be at fault. It has been suggested that the veins, particularly in the splanchnic region, are dilated and that the blood is in them. One fact seems to militate against these two suppositions, i.e., that all the arteries are constricted, and that the blood is largely accumulated in the veins; it has been found that stimulation of an afferent nerve will produce a rise of blood pressure when the animal is in a condition of surgical shock.[18] Such a rise of blood pressure usually comes about through constriction of the arteries rather than through constriction of the veins, and it would appear that there were some arteries at least which were still capable of further constriction. Such a view would necessitate the assumption that all parts of the arterial system were not affected alike by the vaso-constrictor nerves during shock, but that some arteries, possibly those in the splanchnic region, were somewhat dilated.

Whatever the immediate cause of the low blood pressures may be, it may well become part of a vicious circle. Even though the blood be well oxygenated by artificial respiration, and the heart be beating regularly, a previously damaged portion of the central nervous system, e.g., the brain, after subjection to anemia, does not recover as long as the systemic blood pressure remains low.[19] Nor does this fact need surprise us when we remember that, among the other relatively constant conditions of the mammalian body, a blood pressure varying but a few millimeters under the various conditions of activity from day to day or year to year, is an important item. Any considerable variation from this usual level is strong presumptive evidence of abnormal processes involving other mechanisms than that for circulation.

If the law of mass action holds for the reactions of the animal organism, we would expect any very wide departures of any one condition—blood pressure, oxygen or carbon dioxide content of the blood, or whatever it may be—from the usual standard to bring about associated changes in the other conditions coexisting with it.

With regard to the causes of shock, we may consider briefly a few of the current theories or hypotheses.

Crile has assumed as the basis for his explanations a stimulation of the noci-ceptors by the operative procedures. He emphasizes the fact that the afferent nerves are still excitable, and that they are transmitting impulses to the central mechanisms. It is true that in surgical anesthesia with ether, the efferent or motor nerves are still excitable, and probably the afferent nerves are also excitable. But it is a familiar fact, known to every one who has done even the routine mammalian experiments of the student laboratory, that no reflexes of the skeletal muscles can be obtained by stimulation of afferent nerves in an anesthetized dog. But the vasomotor responses, the effects on the heart beat and upon the respiratory movements can still be obtained in response to stimulation of afferent nerves when the animal is in surgical anesthesia. Furthermore, these effects on the smooth muscles and upon the respiratory movements may be obtained in a decerebrated dog or cat. In other words, the only reflexes which can be obtained in anesthetized animals may be obtained equally well in decerebrated animals, and there is no particular reason to suppose that the only reflex path open in anesthesia involves any part of the cerebrum. They are all visceral reflexes through the lower levels of the encephalon.

Dr. Crile, however, says that he finds chromatolysis in the nerve cells occurring in the cerebrum, and attributes this to the effect of afferent impulses. When we consider that, in addition to the fact that no reflexes involving the skeletal muscles, and hence none that could involve the cells of the cerebrum in any way, can be obtained in anesthetized animals, the cerebral cortex is itself inexcitable in such animals, one wonders just how much damage these afferent impulses are doing to the cells of the cerebrum. And, furthermore, while it would not perhaps be so surprising to see some chromatolysis in the general sensory area of the left cerebral cortex after amputation of the right leg, it is passing strange that we find chromatolysis in the visual and

auditory cortical areas of the other hemisphere of the cerebrum.

Similar considerations apply to the cerebellum. There is inexcitability of the cortex, and a complete absence of all the usual reflex phenomena attributable to the cerebellum, such as tone of the extensor muscles of the limbs. Yet, chromatolysis occurs here also.

It is one of the well-established facts of neurology that afferent fibers from a given region of the body terminate in definite regions of the cerebral cortex. And it is likewise a fact that the cells of origin of the motor fibers to the muscles of any given region of the body lie in a definite area of the cerebral cortex. There is a definite localization of the projection fibers, afferent and efferent, in the cerebrum. We should accordingly expect to find chromatolysis in those regions of the cerebral cortex in which the afferent fibers from the injured part end, or in which the cells of origin of the motor nerves to its muscles and glands lie. Such, however, is not the case. Dr. Crile admits that there is no specificity of chromatolysis, but that it occurs in all regions of the cerebrum and in the cerebellum.

It has been shown also that chromatolysis occurs in animals which are not in the condition of surgical shock, but which manifest rather different physical signs.[20]

Finally, Nissl himself pointed out some years ago that chromatolysis was not a lesion indicative of any specific injurious influence, but that it might arise in response to many injurious agencies.

To sum up the situation with reference to the rôle of the cerebrum in, and the relation of chromatolysis to, the cause of shock, the various lines of evidence adduced: (1) that, when an animal is in a condition of surgical anesthesia, no afferent impulses which are normally operative are producing any noticeable reflex response on the skeletal muscles; (2) that, in general the cortical cells are inexcitable to electrical stimuli at such a period; (3) the fact that chromatolysis occurs not only in the particular regions of the brain in which they might be expected to occur on any known basis of localization, but also in other widely removed and scattered regions of the brain; (4) that animals may show a considerable degree of chromatolysis and not manifest any of the physical signs of surgical shock as they are ordinarily understood; and (5) that chromatolysis may occur in response to the action of many diverse injurious agents, such as the anesthetic itself, force one to conclude that the relation of chromatolysis to the onset of shock cannot be very important or very definite.

An animal may be completely decerebrated without showing any particular signs of surgical shock, although the spinal shock may be profound. After a time the reflexes of the skeletal muscles return and the symptoms of spinal shock gradually abate in severity. But it is now possible so to treat the animal as to induce the condition known as surgical shock. The blood pressure falls, the pulse becomes rapid and feeble, and the respiration shallow, or even periodic. Surgical shock may be induced in the absence of the cerebrum, and whatever afferent impulses may be involved in its onset certainly do not pass through the cerebrum. Nor are efferent impulses from the cerebrum demonstrable here.

These facts acquire a peculiar significance with reference to the onset of shock when considered in the light of the relation of the medulla oblongata to the visceral system. It is in the medulla oblongata that we find the first extensive connection between the nerves bearing afferent impulses which are capable of affecting the viscera and the efferent viscero-motor fibers.[21]

In addition to the rapid heart rate and the constriction of the arteries already mentioned, there are certain other effects due to the sympathetic or autonomic system that are worthy of some attention. Space does not permit their consideration at this time. Nor can the discussion of the sources of the afferent impulses be taken up in detail. Both of these questions must be left for future discussion.

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PROPHYLAXIS OF POST-ANESTHETIC VOMITING.*

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I am going to ask the indulgence of this society in calling its attention to some very old, very well-known facts which I believe to be of practical value to the individual about to undergo a surgical operation involving the administration of a general anesthetic.

It should be the aim and object of all of us engaged in the practical administration of anesthetics to adopt every means known towards eliminating or minimizing the disagreeable complications and sequelae that are likely to occur. There is no doubt that of these vomiting is the most distressing and its prevention or reduction will do much towards lessening the horrors of taking a general anesthetic.

Doubtless we all have our own views as to the etiology of vomiting. Many believe it to be influenced largely by the kind of anesthetic used, others by the method of administration. Some think the temperament, the individual idosyncrasies, physical condition of the patient or gentleness of the surgeon to be important factors in the anesthetic recovery. Some regard vomiting as a distinctly local condition, a gastritis due to the irritating effects of swallowed saliva saturated with the anesthetic, while others, and myself included, believe vomiting to be to a large extent simply a local manifestation of some general constitutional disturbance.

It was my good fortune for a period of twelve years to have full charge of the after-care of about 75 per cent. of the patients I anesthetized, and hence I had ample opportunity to observe their recovery from the anesthetic. I don't mind admitting that in that time I spent some very uncomfortable moments when being reproached by individuals who found the after effects of the anesthetic worse than the operation. In my endeavor to minimize such conditions, I tried different anesthetics, different combinations and different methods of administration, and I was struck by the fact that with the possible exception of short anesthesias under gas and oxygen, there seemed to be no definite relationship between the degree of vomiting an individual suffers and the amount of anesthetic, the method of administration or the length of time of the narcosis. I have seen patients vomit frequently and persistently after a short anesthesia for some simple surgical procedure, and others suffer little or no gastric disturbance following a prolonged narcosis for a major operation. I therefore cannot bring myself to believe that these above-mentioned factors play more than a minor part in the etiology of vomiting.

It is perfectly true that some individuals are more prone to vomit than others, and that a certain amount of post-anesthetic vomiting is due to something other than the anesthetic. Persons of a highly neurotic temperament, those badly frightened and dreading the ordeal, are not likely to recover without considerable gastric distress. In this class of cases anoci association as recommended by Crile undoubtedly is of great benefit.

Every now and then we meet with a case with a marked idiosyncrasy for morphia, and the subsequent vomiting is due to this drug. I know of no way of avoiding this error except by careful questioning and omitting the preliminary morphia if there is any suspicion of an unusual susceptibility.

I believe that patients with a pre-existing dilated or displaced stomach are very likely to vomit more than others, and while I do not practice lavage as a routine, I think in this class we should be particularly careful to thoroughly cleanse and drain the stomach before leaving the table. There is no excuse to my mind for vomiting from the swallowing of ether saturated saliva. The buccal cavity should be kept dry by drains placed in the dependent cheek, or, as Dr. Gwathmey recently suggested to me, by a dentist's aspirator.

From the reports of others and from my own observations, I am led to believe that post-anesthetic vomiting is to a large extent the result of some general constitutional disturbance involving the body metabolism and resulting in the formation of toxic substances of an acid nature, and that the best means of preventing such vomiting lies in the adoption of certain precautionary measures previous to the period of induction.

A few years ago I was called upon to anesthetize the wife of one of my most intimate friends. She was particularly apprehensive about the anesthetic because a previous experience had resulted in a prolonged emesis. The operation was a simple one, a perineal repair, and the period of anesthesia was less than thirty minutes. I used nitrous oxide gas and oxygen with the addition of less than half an ounce of ether at the onset. There was nothing unusual about the anesthesia, and the patient left the operating room fully conscious, having had some subconscious gagging as she awoke. About twelve hours later she began to vomit. When I saw her some forty-eight hours after the opera-

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tion, I found that she had been vomiting persistently. The vomitus was scanty and of a distinct coffee ground character. Her restlessness was intense, constantly tossing about the bed, and her lips and sides of her mouth were excoriated from the constant passage of gastric contents. Her pulse was rapid and feeble and she had the expression of a patient suffering from a profound shock, and looked as if she was rapidly going sous grundi. A pronounced fruity odor to her breath and the presence of acetone in her urine led us to believe that she was a case of post-operative acid intoxication, and the prompt application of the proper remedies saved her life, though her convalescence, due to the profound exhaustion, was a protracted one.

It takes an experience of this kind to awaken one, and I immediately began to search the literature for information. I was rewarded by finding many excellent contributions upon the development of acid intoxication following anesthesia, upon the relationship of this condition to post-anesthetic vomiting and upon its therapy and prophylaxis. Caspar, Langenbeck, Guthrie, Bevan and Faville report cases following the use of chloroform under the caption of the so-called delayed chloroform poisoning. Becker, Rhamy, Brewer, Fren, Waugh, Brockett, Stone and Low give their experience after ether, while Chalfant reports from a study of 700 cases the relations between post-operative vomiting and acetonuria. I can find no reference to the development of this condition after nitrous oxide, but it so happens that the worst cases we have had in Baltimore, and in fact two fatal cases that I have been told about, followed short anesthesias under gas and oxygen. The therapeutic and prophylactic sides of the question have been thoroughly treated by Marchand, Bresley, Biddart, Wallace and Gillespie, so you see I am indeed simply calling your attention to an old subject.

The clinical pictures presented by these cases resemble more or less the case previously described, the symptoms varying with the intensity of the intoxication, and the fatal cases terminating in coma. It is hardly within the scope of this paper to go into the theories regarding the physiology of acid intoxication, or the part the anesthetic plays in its etiology other than to say that acetone forms in the system as the result of abnormal fat metabolism, that the complete combustion of fats requires the simultaneous katabolism of carbohydrates, in the absence of which there is a defective and abnormal course of fat metabolism, resulting in the formation of various fatty acids and acetone. This carbohydrate deficiency, barring outside influences such as starvation or restricted diet, results from some disturbance in the glycogen-storing functions of the liver. What part does the anesthetic play in this glycogenolysis? It must be either due to some direct destructive action on the part of the anesthetic upon the liver cells, or else, as MacLeod suggests, to some action upon the splanchnic nerves controlling the glycogen output.

At all events, from a practical standpoint, we are dealing with bad conditions, a toxemia of an acid character and a carbohydrate deficiency. Common sense would seem to suggest the employment of an alkali and a sugar. Bresley in a series of articles describes his results in the treatment of acid intoxication both from a therapeutic and prophylactic standpoint, with bicarbonate of soda. Those treated after symptoms developed rapidly improved, and those treated before operation recovered without any vomiting. He lays great stress upon pushing the soda until the urine is alkaline, reporting cases with absolutely no vomiting, and I wish also to emphasize this point. Later Biddart also reports his results with the use of glucose as a prophylactic, giving half an ounce every four hours for six doses. Wallace and Gillespie draw their conclusions from a study of three series of cases, treated (a) with soda, one-half drachm every four hours until half an ounce has been taken; (b) with glucose, half an ounce every four hours for six doses; and (c) with no treatment. They believe that the carbohydrate treatment is more effective as a prophylactic to control vomiting than the alkali, but that the alkali is more efficacious after symptoms have developed. In the control series where neither was used there was distinctly more vomiting than in either of the other two groups of cases.

I could see no reason why both an alkali and a carbohydrate should not be given both before and after anesthesia. Accordingly I began giving patients one drachm of soda bicarbonate and one drachm of lactose every four hours for at least forty-eight hours before operation. I purposely gave a small dose of carbohydrate in accordance with Taylor's theory that a small amount of carbohydrate is sufficient to check an acidosis. If upon admission to the hospital the urine was acid, the dose of soda was increased so as to have the urine alkaline at the time of operation. Immediately upon returning to the room the patient is given a 5 per cent. solution of sugar per rectum by the Murphy drop method, using usually about 250 c.c. or 300 c.c. at a time. Sips of a 2 per cent. soda solution are given repeatedly for the first day and upon the second and third days 30 grains are

given every four hours. The sugar solution is repeated on the second day and later until the patient is on a diet sufficient to prevent any carbohydrate starvation.

Following out the theory of Waugh that a too restricted diet or excessive purging might be conducive to subsequent acidosis, Dr. Stickney of the Woman's Hospital has rearranged the preliminary routine prior to operation. He gives a purge of castor oil forty-eight hours before operation, and an enema the night before, repeating same in the morning until the fluid is clear. If the patient enters the hospital within twenty-four hours of time for operation the purge is omitted and the bowels emptied only by enemata. Regular diet with plenty of starchy food is maintained until noontime of the day before operation, then a slight supper and albumen and sugar water at midnight. Of course, this régime varies somewhat according to the nature of the operation.

Our results have been most astonishing. We have had no cases of severe vomiting and many with absolutely none at all.

Formerly vomiting was looked upon as to be expected, now it is the exception. Of course, one will say that frequently cases recover without any vomiting. This is perfectly true, but the most striking evidence of the part an acid intoxication plays in post-anesthetic vomiting and the efficacy of prophylactic treatment is seen in those patients who have had several anesthesias, giving a history of severe vomiting with no prophylactic treatment and none at all when properly protected against an acidosis. I believe that nearly everyone develops more or less of an acidosis after a general anesthetic. Whether they will show symptoms of an intoxication or not depends upon the eliminating powers of their kidneys. In a series of cases we examined the urine before and after anesthesia for acetone and found it present in nearly every case after operation. The degree of acetonuria, however, was of no prognostic value in determining the possibility or probability of an intoxication for the reason just given. There is no doubt that some individuals are more prone to subsequent intoxication than others. Children are very susceptible. Patients with a wasting disease, those with preexisting vomiting as a symptom of their surgical ailment, are the ones to look out for. I have also been very much impressed with the apparent close association between nervousness and fright and subsequent acidosis.

I regret exceedingly that I have been unable to substantiate my remarks with detailed statistics of a given number of cases. Scattered as they have been in different hospitals, I can base my conclusions only upon the opinions of patients, nurses and surgeons. These seem so uniformly favorable to the benefits derived from prophylactic treatment of post-anesthetic vomiting on the supposition that it is largely the result of an acid intoxication that I feel justified in calling this society's attention to the subject in the hopes that its efficiency will be tried by others.

THE INFLUENCE OF ANESTHESIA ON ACIDOSIS.*

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The energy of the body which, in different ways is derived from the environment, is temporarily stored in the several organs and tissues until in response to some adequate stimulus it is transformed into heat or motion. Prominent among the products of this transformation of latent into kinetic energy are acids. We may say that every motion, every emotion, every injury, every physical exertion, every degree of fever, every reaction to infection or to autointoxication, every respiratory movement, every heart beat, produces an acid. Under normal conditions these acids are neutralized into harmless compounds, which are eliminated by the kidney, so that under normal conditions the body tissue and fluids are for the most part slightly alkaline. If every activity of the body produces acidity in a greater or less degree, it is vitally necessary for the body to maintain a large margin of safety against acidosis by the presence of alkaline salts and bases, which are derived from food.

Experiments have shown that for the maintenance of its normal state of slight alkalinity, the body is dependent primarily upon the liver, and secondarily upon the adrenals. When the liver is excised the blood soon loses its slight alkalinity and in a few hours becomes acid. When the adrenals are excised the alkalinity of the blood is maintained for a longer period, perhaps twice as long, but it then becomes acid, and in each case the acidity of the blood is the close precursor of death. The excision of no other organ in the body produces this tendency to immediate acidosis.

We cannot dwell here upon other experimental observations which show the relative activities of the liver and the adrenals in this neutralizing

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process, nor the evidence that the liver and the adrenals are directly controlled by the brain, which also controls the transformation of energy, which in turn, as we have already stated, always produces acidity; we will merely recapitulate by saying that the harder the body is driven by any stimulus, the more rapidly will latent energy be transformed into kinetic energy. The more rapid the transformation of energy, the greater the production of acid. The greater the production of acid, the greater also the strain upon the power of neutralization possessed by the liver and the adrenals, and the greater the drain upon the body's store of alkalies and bases. When the liver and the adrenals are overtaxed, and the alkalies and bases are exhausted, the state of acidosis is reached.

Clinically it has long been recognized that when a patient is in a state of exhaustion resulting from infection, from injury, from shock, from starvation, from hemorrhage, or from any other cause whatsoever, he may never recover consciousness after the administration of a general anesthetic. In a Hungarian reference, the title of which I do not recollect at the moment, it is shown that starved dogs inevitably die after inhalation anesthesia. Clinicians know well how unsafe it is to give a general anesthetic of any kind to a patient on the verge of acidosis. A patient with chronic vomiting, with or without chronic pyloric obstruction, with an acetone odor of the breath, with peculiarly pink lips and dry tongue and mouth will in all probability never regain consciousness after being anesthetized. The aged not infrequently die after even a short anesthesia.

Why do not these patients recover? If the patient has the power of consciousness before the anesthetic is administered what happened during the anesthesia to make it impossible for the patient to regain consciousness?

We have already referred to the acid-producing power of stimuli. Shall we conclude therefore that the trauma of the operation alone may have pushed beyond the margin of safety the neutralizing powers of the body already taxed by pre-existing conditions; or is the anesthetic itself a factor in producing the fatal result?

To answer this question, Dr. Menten in my laboratory made for me observations of the H-ion concentration of the blood under various conditions —the H-ion concentration being an index of the acidity of the blood.

H-ion concentration tests were made after the application of many kinds of stimuli, the results of which confirmed the postulate which we have already stated, that acidity is the result of the activation of the body by any adequate stimulus. The blood was then tested to determine the H-ion concentration in ether anesthesia, in nitrous oxid anesthesia, and after the administration of alcohol and of morphin. Both ether and nitrous oxid produced a marked increase in the H-ion concentration, that is, both produced acidity in the blood. After coming out from the anesthetic this acidity was neutralized by the animal in about thirty minutes. This result gave us our clue to the tendency to acidosis and to death after anesthesia of weak and emaciated patients. The increased acidity produced by the anesthesia was sufficient to overcome the already narrow margin of safety. That acid intoxication *follows* the administration of ether and chloroform has been noted by many observers, the acidity being evidenced by the early appearance in the urine of acetone and later diacetic acid. It has also been noted, as one writer states, that the "starvation preceding and following the operation is also a factor of considerable importance."

Our experiments have shown, however, that the increased acidity actually develops *during the anesthesia* itself, sometimes to a fatal degree, and that a starved condition is not only of "considerable" but of *prime* importance, since it means that the acid-neutralizing power of the liver has been purely impaired, if not possibly lost.

Two more important clues were obtained from the result of the H-ion concentration tests after the administration of morphin and of alcohol. Alcohol caused acidity, the acidity not being so marked, however, as that produced by the anesthetics. The H-ion concentration was not altered by morphin, no matter what the size of the dose. When the administration of morphin preceded the induction of anesthesia then a smaller amount of the anesthetic was required to produce complete anesthesia, and the H-ion concentration test showed that the acidity was markedly less than in anesthetized animals which had not received the preliminary dose. The preliminary dose of morphia not only lessened the degree of acidity produced by the anesthetic, but it in no way interfered with the return of the blood to its normal alkalinity; on the contrary, and the following observation is of great significance, if morphin was given *after* acidity had been produced by the anesthetic, it postponed the time of neutralization, and if given in large doses *prevented* the animal from overcoming the acidosis. That is, it would appear that morphin controls the mechanism which governs the neutralization of alkalinization of the blood.

These H-ion concentration or acidity tests of the blood have therefore given us the clue and an invaluable clue to the treatment of patients with mild acidosis or in whom acidosis is threatened. Since in every case the presence of diseased conditions is undoubtedly producing a mild acidosis, needlessly long anesthesia is to be avoided, as the increased acidity produced by the anesthetic will diminish the patient's margin of safety. The degree of acidosis seems to be proportional not only to the length but to the depth of the anesthesia. Therefore the lightest possible anesthesia should be maintained. With starved patients, with patients whose vitality is at a low ebb, in whom acidosis is already markedly present, the inhalation anesthetic may be absolutely contraindicated. If an operation is mandatory it may be performed under local anesthesia, or in the analgesia of twilight anesthesia produced by the gentlest administration of nitrous oxid oxygen.

In cases of acidosis especially nitrous, oxid oxygen anesthesia is always the anesthetic of choice, for though our tests have shown that like ether it does produce acidity in the blood, unlike ether it is not a lipoid-solvent; does not impair the immunity of the body, and to some extent conserves the energy in the brain-cells from exhaustion.

Although, as I have shown elsewhere, both the pre-operative and the post-operative use of morphin is of great value in certain cases, in these cases of existing or threatened acidosis its use is contraindicated since it interferes with or prevents the neutralization of acidity in the blood, but bromides per rectum may be safely given to diminish the pre-operative psychic strain. The pre-operative administration of sodium bicarbonate and glucose is of value also.

To recapitulate: The ideal treatment for the class of patients we have been considering, those handicapped by exhaustion, in whom acidosis is present or is threatened, is:

1. The pre-operative administration of sodium bicarbonate and glucose and of bromides per rectum.

2. Ether twilight or a light nitrous oxid oxygen anesthesia.

3. A technic so accurate and so completely anociated by the use of local anesthetics and gentle manipulations that but a small amount of the anesthetic is needed.

4. As rapid a technic as is consistent with good work that the period of anesthesia may be as short as possible.

INSUFFLATION ANESTHESIA.*

By F. W. NAGLE, M.D.,
Lecturer on Anesthetics and Demonstrator of Pharmacology, McGill University, Montreal; Anesthetist to the Royal Victoria Hospital, Montreal, and to the Montreal Maternity.

To produce anesthesia by the inhalation of volatile anesthetics is a difficult mechanical procedure, and the results of such an anesthesia, both immediate and remote, are often alarming. The mechanical difficulty is due to the obstruction presented by the upper respiratory tract, which is increased by the local action of the anesthetic. The evil and sometimes fatal results are due to overdosage and uneven dosage, chilling of the lungs by cold inspired air, aspiration into the lungs of foreign material, and fatigue from the undue load placed upon the respiratory system.

For these reasons inhalation anesthesia has fallen somewhat into disfavor; and local, spinal, intravenous, and colonic anesthesia have been tried in its stead. It cannot be denied that in many cases these alternative methods are expedient, but the necessity for their use has been greatly lessened by the introduction of an improved method of administering anesthetics by the respiratory route, insufflation anesthesia.

By "insufflation anesthesia" I mean the condition which is produced by blowing into the patient's pharynx or trachea a quantity of air or gas sufficient to supply all *his* respiratory needs without effort upon his part, containing an evenly distributed, and consequently non-irritating, minimum dose of the anesthetic agent.

It is now three years since I began the use of this method, and to-day, more than ever, I am convinced that, for the majority of cases, intratracheal insufflation is the best method, and pharyngeal insufflation the next best method, for administering anesthetics through the respiratory tract.

ADVANTAGES.

The first advantage of insufflation anesthesia is that it prevents undue exertion of the respiratory system by overcoming the mechanical obstruction to the entrance of air, which exists largely in the patient's mouth.

The second advantage is that it permits of dosimetric administration; that is, all the air delivered to the patient can be measured, and can be supplied with an evenly distributed and measured amount of anesthetic per minute. The local action and reflexes caused by irritation when too concentrated an anesthetic is given, or when it is poorly

*Read during the Second Meeting of the American Association of Anesthetists, at Atlantic City, June 22, 1914.

mixed with the inspired air, are thus abolished. Dosimetric instruments which do not employ insufflation are very inaccurate because (1) they depend upon extremely variable factors, the respiratory rate and value of the patient, which are affected in turn by the anesthetic, and a vicious circle is often produced; and (2) they do not supply *all* the air required by the patient, and the efferent mixture is, therefore, diluted with varying quantities of air drawn in directly from the room.

Using the insufflation method, Connell, of New York, has devised an instrument—"The Anesthetometer"—which is absolutely accurate in dosimetry. This apparatus allows us to measure and record our dosage, and compare and standardize our results, so that we can place our empirical knowledge upon a scientific basis, and employ it not only to our own future advantage, but also as a basis of knowledge for those who would otherwise have to learn as we learned—by rule of thumb and personal experience.

The third advantage is that the anesthetic mixture can be warmed and moistened accurately. In this connection I have found in practice a grave fault in the warming apparatus of our instruments: the air and ether mixture, in passing over the hot water, picks up steam, some of which is condensed in the efferent tube. Surely, when this condition is present, there must be too much moisture in the mixture.

I had hoped to describe in detail in this paper a dry heater with separate moistener which is at present being made for the Royal Victoria Hospital, but it is not finished. However, the idea is this: The heater consists of a coil of copper tubing around which a wire resistance is wound. The heat of this apparatus is controlled by a rheostat, and the temperature of the anesthetic mixture which passes through the copper tubing is read from a thermometer placed at the beginning of the efferent tube from the instrument. The air is moistened after leaving the heater, so that too much moisture cannot inadvertently find its way into the anesthetic mixture.

The fourth advantage is that the danger of aspiration is overcome absolutely in intratracheal insufflation. In pharyngeal insufflation it is practically overcome; for, owing to the fact that the anesthetic is delivered behind the tongue and fauces, and that it is evenly distributed and diluted, it does not produce the hypersecretion found in inhalation anesthesia.

The fifth advantage is the improvement in the type of anesthesia produced; quiet breathing, excellent color, normal pulse and blood pressure, absence of venous engorgement, perfect relaxation, and quick, uneventful recovery.

The sixth advantage is that, in case of necessity, an ideal means of artificial respiration is already at hand. This is especially useful in intrathoracic surgery.

The seventh advantage is the ease of administration. The anesthetist needs to give only a small amount of his attention to the instrument, and consequently can take much more accurate care of his patient. Besides, he is not fighting for room and endangering the asepsis of the operative field.

TECHNIC.

In discussing the question of technic, two parts of the apparatus must be considered: (1) the instrument proper, and (2) the efferent tube system.

The instrument proper should give a respirable stream of air or gas, warmed and moistened, with which the anesthetic is evenly mixed. The operator should be able to control and register the volume of air or gas, the amount of the anesthetic, the temperature, and the moisture. A manometer and safety valve should be inserted into the efferent tubing to prevent any undue pressure reaching the patient's lungs, all of which requirements are fulfilled in the Connell anesthetometer.

The tubing system for carrying the anesthetic mixture from the instrument to the patient should, for intratracheal anesthesia, terminate in a catheter, which is inserted into the trachea down to a point three-quarters of an inch above the bifurcation. This catheter should have a terminal opening, and at least two lateral openings near the tip; it should be made of material which will stand repeated boiling; and its caliber should be relatively small compared with that of the trachea. It should be introduced under direct illumination, after the patient has been well anesthetized.

For pharyngeal anesthesia the tubing system should end in a Y-tube carrying two catheters, which are passed through the nose deep into the pharynx. For this method deep initial anesthesia is not necessary.

In actual practice in hospital I have used, for both kinds of insufflation, the Janeway Insufflation Apparatus. This instrument is not dosimetric. For intratracheal insufflation I use on an average 20 mm. pressure; and for intrapharyngeal insufflation, 30 mm. For introducing the intratracheal tube the Chevalier Jackson Pharyngoscope has always answered perfectly.

I have special tubes made for this work, which are almost rigid when cold, but soften up when

in use. They can be boiled many times without becoming rough.

For use outside the hospital I have made up an insufflation machine of the Gwathmey three-bottle inhaler, by substituting a small motor and pump for the foot-bellows and providing a safety valve with manometer, which I think greatly improves the original instrument.

Two things have prevented the more extensive use of insufflation anesthesia in our hospital:

(1) Although we have had no bad results from its use, some surgeons are prejudiced against intratracheal intuabtion.

(2) The noise of the instrument is very disagreeable, especially in a teaching clinic. This objection will, however, soon be overcome by the installation of a central compressed air plant in the basement with pipes carrying a supply to each operating room.

CONCLUSIONS.

(1) That insufflation is the best and safest means of introducing volatile anesthetics through the respiratory system.

(2) That accurate dosimetry can be applied to the insufflation method, and should be used when possible.

(3) That, if we wish to avoid bad results, we must follow carefully the principles laid down by Meltzer concerning the size and character of the tube and the method of insertion.

(4) That, if insufflation is used, especially if it is combined with measured dosage, the respiratory route can be chosen in a much larger percentage of cases, to the ultimate advantage of the patient, and the need for more extraordinary routes and methods of administration will to a great extent disappear.

104 SHERBROOKE STREET, WEST.

THE JANUARY SUPPLEMENT

¶ TREATMENT OF POST-OPERATIVE SHOCK.

PROF. CHARLES LIEB
Columbia University, New York

¶ CONTINUOUS ANALGESIA WITH SOMNOFORM — TECHNIC OF ADMINISTRATION. *(Illustrated)*

WM. HARPER DEFORD, D.D.S., M.D.
Drake University, Des Moines, Iowa

LOCAL ANESTHESIA AS APPLIED TO THE RADICAL CURE OF VARIOUS FORMS OF HERNIA.*

BY JAMES F. MITCHELL, M.D., F.A.C.S.,
WASHINGTON, D. C.

Fourteen years ago, while resident surgeon at the Johns Hopkins Hospital, I had an unfortunate experience in the case of a father and two sons operated upon for inguinal hernia. At that time most of the hernia operations were done under general ether anesthesia. The boys made uneventful recoveries. Forty-eight hours after operation the father developed double pneumonia and died. A little later I saw a second death from pneumonia following an operation under ether for an umbilical hernia in a very stout woman. I realize thoroughly the great strides which have been made in the art of anesthesia since that time, and know that with present-day methods such occurrences must be extremely rare. It must be granted, however, that there is still a small element of danger in the very best hands. Where an operation can be as well and as thoroughly done under local as under general anesthesia, there is some advantage in the local method in that it adds one more factor of safety.

Since the occurrences related I have endeavored to eliminate as far as possible general anesthesia in all hernia operations. Dr. Harvey Cushing had already published his paper describing his method picturing the nerve supply of the inguinal region. During the first few years a general anesthetic was used occasionally, partly because the patient insisted upon it, partly because of our timidity in undertaking difficult cases. With increasing experience we have now reached the point where practically all hernias can be painlessly operated under local methods. During the past six or eight years a general anesthetic has never been given for a hernia operation unless there was some other coincident operative procedure which necessitated it. For a time recurrent hernias and large post-operative or umbilical hernias in very stout people were done under the combined method, but at present these offer little difficulty. It is also most gratifying to note that the various house officers have so acquired the habit through assisting at these operations that in their own cases local anesthesia is almost invariably used. The present resident surgeon at Providence Hospital has thus done sixty inguinal hernias during the past year. We find that in our clinic the knowledge of the method is

*Read during the Second Meeting of the American Association of Anesthetists, at Atlantic City, June 22, 1914.

passed from patient to patient, and not only de we rarely have any difficulty in persuading them to submit to the operation under local anesthesia, but as a rule they demand it and many come to us because of its use. Where one operation has been done under the local method, and a second becomes necessary, general anesthesia is never requested, but the local is insisted upon. Age and sex matter little. Our youngest case was nine years of age, the oldest ninety-seven. Exact figures have not been compiled, but our cases now number many hundred.

From the standpoint of the patient the advantages are evident. While absolute freedom from post-operative nausea and distension is not claimed, both are certainly lessened and, provided sufficient care is taken in the pre-operative preparation of the patient and in the handling of tissues, especially the parietal peritoneum, during the operation itself, they may be reduced to a minimum. I am thoroughly convinced that the preliminary hypodermic of morphia is responsible for much of the distension and nausea. The preparatory treatment should be the same as for a general anesthetic, with this exception, that a cup of coffee or a glass of milk may be given just before the operation. During the operation itself water may be taken freely and the patient is often allowed to smoke. It was at one time our custom to allow a resumption of normal diet shortly after the operation. It has been found, however, that this is not a good plan and that it is much better to limit the diet to liquids for the first twenty-four hours. Retention of urine is almost unknown and may be entirely avoided by keeping the patient in bed for twenty-four hours before the operation and educating him to the use of the urinal. There is some post-operative pain which usually appears within the first two hours and necessitates a small hypodermic of morphia, which should not be withheld.

As to the immediate results, healing is better than under general anesthesia, due most likely to the more careful handling of tissues. We have had no deaths and no post-operative pneumonias. A comparison of our ultimate results with those obtained under general anesthesia would be of no value; for it must be remembered that operations under local anesthesia have been done at a time when our knowledge of the necessities of successful hernia operations is so much better developed. There is no doubt, however, that every step of the operation can be as carefully and thoroughly executed under local as under general anesthesia.

From the standpoint of the operator dissatisfaction may be attributed primarily to hurry or lack of time, and secondly to insufficient familiarity with the details and requirements of local anesthesia. These operations undoubtedly require more time than when the patient is unconscious, but with increasing experience the time limit is reduced. Great speed, however, is obtained at the expense of pain, and the time required for an ordinary inguinal, femoral or umbilical hernia can with difficulty be brought under an hour. Naturally this is prohibitive where many cases are scheduled for one day. Another objection is the wear and tear on the operator; for one is more fatigued by the additional strain of the careful dissection and the effort to converse with the patient—a faculty which, however, is soon acquired by practice.

It is not necessary to describe those details which are essential in all local anesthesia operations; but suffice it to say that the patient should be in a comfortable position on a well padded table and quiet as far as possible should prevail in the operating room. The most satisfactory apparatus is the graduated Record syringe, glass with metal piston, of a capacity of 10 and 20 c.c., with nickel needles of varying size and length. In the great majority of our cases in the past cocaine has been the anesthetic; but this is rapidly being discarded in favor of the less toxic novocain. In either case adrenalin is added to intensify and prolong the drug action and to prevent absorption. One-tenth of one per cent. cocaine is sufficient for infiltration and one-half to one per cent. for injecting the nerves; or one-half per cent. novocain for infiltration and one to two per cent. for nerve injection. We have never seen toxic effects from cocaine in even the most extensive operations; but novocain solutions being so easily prepared and having the advantage of less toxicity, are certainly to be preferred.

We will describe the technic of the operations which have proven best in our hands for the various forms of the usual hernias with the idea of showing the use of the local anesthetic in the different steps rather than to exploit any particular type of operation.

INGUINAL HERNIA.

As was beautifully shown by Cushing, the inguinal region is especially adapted to regional anesthesia because of the fact that it is almost entirely supplied by two nerves, the ilio-hypogastric and the ilio-inguinal, which can be readily reached for blocking. It has been our custom to follow the method of Cushing and to anesthetize the skin separately. According to Braun the whole injection

is made before the skin is incised, the inguinal region being thoroughly infiltrated through one or more punctures and the nerves thus reached by diffusion. It is here necessary to wait from fifteen to twenty minutes before beginning the operation, while with a separate skin injection the incision may be made at once. In double hernias we sometimes employ Braun's method for the second operation, making the injection before starting the first incision so that anesthesia is well established by the time the first side is finished. The line of incision extends from a point one-third the distance from the anterior spine to the umbilicus, downward in the direction of the inguinal canal to a point slightly above the external ring. A skin wheal is produced with the weak solution the whole length of this line and through it the subcutaneous tissue is also infiltrated. By pinching up the skin tightly between the thumb and finger even the first needle prick may be made painless. The needle may at the same time be carried through the external oblique and some of the solution distributed between it and the internal oblique. The skin incision is made and in the upper part is carried down directly to external oblique. The line of the inguinal canal, marked usually by a thinned out area in the external oblique is now readily observed. Along this line an incision is made in the direction of the fibers of the external oblique and the muscle flaps retracted with a couple of clamps. The ilio-inguinal nerve is immediately exposed running to the outer side of the cord towards the external ring. This is injected with the stronger solution, the needle being thrust into the substance pointing centrally. In this way dragging on the nerve is prevented and the injection is painless. The ilio-hypogastric nerve is found lying usually along the lower border of the internal oblique running towards the median line and perforating the external oblique at the outer edge of the rectus muscle. This nerve is likewise injected. Unless this is done before the lower part of the subcutaneous tissue is divided unanesthetized nerve fibers may be cut, causing some pain.

The nerves are subject to great variation, but not enough to cause any difficulty in their exposure or identification. The skin and subcutaneous tissue being widely retracted, the incision is continued parallel with the fibers of the external oblique directly through the external ring. The edges of the external oblique are retracted and the nerve dissected free and held to one side with the clamps on the muscle edges. The cremaster is now divided in the same way in the direction of its fibers and in the case of an oblique hernia the sac and cord are exposed. If the hernia be direct the sac is found lying to its median side. A diffuse injection of the weak solution is made all about the neck of the sac and if possible is carried well up beyond its neck in the subserous connective tissue about the parietal peritoneum. It is not necessary at this stage of the operation, if the sac presents, to expose the cord. The sac is opened and its contents reduced or excised as may be indicated. It must be remembered here that omentum or intestines, which may present in the sac, have no sensation, and no pain is experienced in their handling unless traction is made from below. Omentum may be freely excised or the intestines resected without pain provided traction is avoided.

We frequently at this stage remove an appendix, which may presenting in the hernial sac. The sac being widely opened and its contents cared for, a long needle is introduced from within the sac just beneath the peritoneum, and a further injection made to insure complete anesthetization of the neck of the sac and parietal peritoneum above. The neck can be readily recognized by a dense white band indicating a thickening in the peritoneum. It is in the line of this band that the infiltration is best made. Pulling upon the sac without this thorough anesthetization will cause pain, pallor, nausea and even severe vomiting. The sac is now cut across close to the neck and being dissected free from the surrounding structures is closed high up with a purse-string suture of fine silk. The ends of this suture are left long. A finger is passed within the internal ring and with it as a guide the ends of the purse-string suture are threaded one at a time on a curved needle and carried up beneath and through the internal oblique, carefully avoiding the ilio-hypogastric nerve. They are tied on the anterior surface of the internal oblique, thus leaving the neck of the sac fixed high above the exit of the cord. By dividing the sac at this early stage of the operation, the removal of its lower part is done without any discomfort whatever, peritoneal sensation having been interrupted.

From this point on little or no care is necessary as far as pain is concerned. The remaining steps differ with different operators. The cord may be transplanted or not. It is our custom in hernias in adults to transplant the cord in the majority of cases. It is gently lifted from its bed and suspended on a piece of gauze. The muscle layers being isolated the sutures are now introduced. Our present suture material is fine linen. The first stitches include on the median side cremaster, in-

ternal oblique and conjoined tendon and possibly the edge of the sheath of the rectus muscle as close as possible to the pubic spine. Passing under the cord the cremaster is again picked up and the needle is introduced from within through the lower part of Poupart's ligament close to the pubic spine on the outer side. The needle is now carried back through cremaster, under the cord, and the suture is tied. Three or four of these are placed beneath the cord, bringing over the internal oblique to the under surface of Poupart's ligament. In the case of muscular weakness or atrophy of conjoined tendon the rectus is readily transplanted without further application of the anesthetic. In direct hernias the sac offers more difficulty because of the surrounding fat, and here we always transplant the rectus. It may sometimes be necessary to divide the epigastric vessels in order to thoroughly free the neck of the sac in direct hernias. The row of deep stitches is continued upward until strong internal oblique muscle is sutured to Poupart's ligament beneath the cord. One similar stitch is taken above the cord. As a rule when these are all placed the point at which the sac is attached can be seen well above the last suture. The cord and the two nerves which have been carefully protected are allowed to drop back into place on top of the internal oblique. The lower flap of external oblique is brought over the cord and sutured to the anterior surface of the internal oblique with fine linen, silk or catgut. The upper flap is overlapped and sutured to the anterior surface of the lower flap with similar material. The deep fascia may be brought together by two or three sutures of catgut and the skin is closed with a running through and through fine silk stitch. Ordinarily a small protective wick is brought out at the lower end of the incision. This has never given trouble and is removed at the first dressing, which is done from the eighth to the tenth day. Iodine preparation is ordinarily used and a dry gauze dressing over which a starch bandage is placed in order to prevent unusual motion for the first few days. Distention is relieved by enemata and the bowels usually moved in forty-eight hours. The patients are allowed to be turned immediately after the operation; but are kept flat in bed for about ten days, when they are gradually propped up and are allowed out of bed in from two weeks to sixteen or seventeen days. This usually means a maximum hospital stay of about three weeks, with a period of discomfort which rarely lasts through the first forty-eight hours and in most cases does not exist.

RECURRENT HERNIAS.

These offer little more difficulty as far as obtaining anesthesia is concerned. The incision must be carried higher in order to expose the nerves well above the old scar. These being injected, the operation may be carried out with as great precision and as much ease as where general anesthesia is used. The method of injecting the nerves separately after their exposure is in these cases undoubtedly much more satisfactory than a diffuse injection through several points before the skin incision is made; for the scar of the previous operation renders a diffuse injection most difficult. In very fat subjects it may be difficult to locate the nerves, but by first dissecting off the layer of fat which surrounds them they may be readily exposed. Recurrent hernias naturally offer greater difficulty from a technical standpoint because of the scar tissue and the fact that often one is not familiar with the nature of the operation which has been done before.

FEMORAL HERNIA.

The femoral hernia offers a good field for the diffuse primary infiltration of Braun, although here also we use a separate skin injection. The line of incision extending perpendicularly over the femoral canal is injected thoroughly with a weak solution and through this the needle is thrust all about the prominence of the heria. Care has to be taken not to injure the femoral vein which lies in close apposition. The needle is also carried through the external oblique above Poupart's ligament and a diffuse injection made beneath this muscle to block fibres of the ilio-hypogastric and ilio-inguinal which may run into the femoral region. Dissection of the sac is then very readily accomplished. When the sac is dissected free a second injection should be made close about the neck of the sac and this should be carried well up within the femoral ring in order that a high ligation of the sac may be made. The contents of the sac may then be treated in the same way as in an inguinal hernia and the same precautions observed as to dragging on the mesentery. We have resected small intestine with good result in a patient eighty-four years of age in a strangulated femoral hernia. The sac being opened and its contents disposed of, the neck is thoroughly freed and ligated as high as possible with a purse-string suture of fine silk. The lower portion is removed and the stump allowed to retract within the femoral ring. The closure of the femoral ring involves no sensitive tissues and the sutures can be placed with absolute freedom from pain. One or more mattress sutures pass through Poupart's ligament picking up pectineus muscle or

fascia, then the fascia about the femoral vein, and back through Poupart's ligament. The skin is closed with a continuous through and through fine silk stitch. The patient may be allowed to get up in two weeks. We have never seen a recurrence after this operation.

UMBILICAL HERNIA.

The nerve supply in the umbilical region is diffuse and the regional method does not here apply. The circumscribing diffuse injection of a weak solution, however, renders operation extremely simple and painless. We are accustomed to using a double elliptical incision, which includes the umbilicus. The skin in the line of incision is injected with the weak solution and before the skin incision is made a long needle is carried down along the hernial sac until muscle is reached. The whole region of the hernial protrusion is thus bathed with the weak solution by a circumscribing injection. The skin incision is made and the dissection slowly carried through the fat, and any large vessels or prominent nerve fibers which may be encountered are given a separate injection before being divided. When the muscle is reached the dissection is carried close to the neck of the sac until it is well isoloated. A needle is then introduced into the sac wall and the whole region of the neck is well infiltrated and the peritoneum injected as far as possible on all sides. The sac is cut across flush with the muscle wall. In doing the Mayo operation it is well now to introduce the needle through the muscle and to inject well the subserous connective tissue. In case a large amount of solution has been used in getting to this stage of the operation it may be better to inject the peritoneum only at the points where the needle will be introduced for the placing of the sutures. In this way the stitches can be easily placed and tied. The external layer of sutures offers no difficulty.

The use of local anesthesia for umbilical hernias in very stout people is most highly recommended. It is just these patients who in the past have been most likely to develop pneumonia after a general anesthetic and the operation can be so readily and so painlessly done that the advantages of the local method are at once evident. We have been able to carry to a successful termination most extensive umbilical hernia operations. I recall one case especially in which a woman weighing some three hundred pounds had a very large hernia which contained many feet of adherent small intestine as well as the transverse colon and omentum. The operation would have been necessarily long, even under a general anesthetic. Under local anesthesia it required three hours for its completion. The hernial opening, after the sac was excised, and its contents reduced measured about 15cm. in diameter. We were able to get a good firm overlapping closure and the patient recovered from the operation with no nausea, no shock, and now after several years is entirely well. The abdominal wall is strong and she has had no suggestion of recurrence of the trouble.

It is in these large operations especially that novocain with its lower toxcity offers such distinct advantages in the field of local anesthesia. Many post-operative hernias come under the same category, and we are beginning to rely on local anesthesia for operative work in this line more and more. The dissection of the muscle layers in these troublesome operations is naturally extremely tedious and difficult, but with patience and a careful introduction of abundant anesthetizing fluid the hernia of this type, which cannot be as successfully treated under local anesthesia as under general, is extremely rare.

We believe more and more that all types of hernias can be operated under local anesthesia. It is simply a matter of time, patience, familiarity with details and sufficient experience. That an extra factor of safety is thereby added is sufficient reward for the additional wear and tear on the surgeon himself.

THE JANUARY SUPPLEMENT

¶ THE PROPER DEPTH OF ANESTHESIA.

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¶ PERCENTAGES IN NITROUS OXID-OXYGEN ANESTHESIA.

KARL CONNELL, M.D., F.A.C.S.
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¶ REBREATHING IN ANESTHESIA AND ANALGESIA.

E. I. McKESSON, D.D.S., M.D.,
Toledo, O.

¶ THE ADVANTAGES OF COMBINED ANESTHESIA IN THE OPERATIVE TREATMENT OF HEMORRHOIDS.

ISADORE SEFF, M.D.
Beth Israel Hospital, New York

¶ MEDICO-LEGAL ASPECTS OF ANESTHESIA AND ANALGESIA.

A review of American and Continental Court decisions involving the relations of the Anesthetist and Surgeon to Anesthesia, Analgesia and the Law (1914).

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F. HOEFFER McMECHAN, A.M., M.D., *Editor*
Cincinnati, Ohio, U.S.A.

October Introductory Number A.D., 1914

"*Friar Laurence:* Take thou this vial,
And this distilled liquor drink thou off,
When, presently, through all thy veins shall run
A cold and drowsy humor; for no pulse
Shall keep his native progress, but surcease:
No warmth, no breath, shall testify thou liv'st;
The roses in thy lips and cheeks shall fade
To paly ashes; thy eyes' windows fall,
Like death, when he shuts up the day of life;
Each part deprived of supple government
Shall, stiff and stark and cold, appear like death,
And in this borrowed likeness of shrunk death
Thou shalt continue two and forty hours,
And then awake as from a pleasant sleep."
Romeo and Juliet.

INTRODUCTORY.

The editorial policy of this SUPPLEMENT will be one of *service*.

For the first time in the history of medical journalism a journalistic medium is being provided for advancing the science and practice of anesthesia and analgesia, and for improving the status of the anesthetist. Needless to say the energies of the EDITOR and his ASSOCIATES will be devoted to making the SUPPLEMENT subserve the useful purposes for which it has been founded.

Primarily established as a medium for progressive anesthetists, medical and dental, and their organizations, for the exchange of experiences and the comparison of methods, the SUPPLEMENT is also intended to actively serve the interested surgeon, and to be a complete and reliable source of practical information for the large body of practitioners who include the administration of general anesthesia and the use of local analgesia among their accomplishments.

To maintain an editorial policy of *service*, the EDITOR requests those interested to favor the SUPPLEMENT with their original contributions, clinical or experimental, first hand; and he cordially invites associations of anesthetists to utilize the SUPPLEMENT for the publication of their transactions.

In conclusion the editor wishes to extend his heartiest thanks to those whose assistance has made the issuing of this SUPPLEMENT a possibility, and to acknowledge his debt of gratitude to those associates, who by their personal co-operation are giving the SUPPLEMENT a national and international scope. Also the editor solicits the continued support of all those who may appreciate the *service* which the SUPPLEMENT will provide.—F. H. M.

A MARTYR TO THE CAUSE OF MEDICAL KNOWLEDGE.

A fact scarcely known, but well worth recording, is that the American edition of Prof. Dr. Heinrich Braun's "Die lokal Anasthesie" cost the translator his life.

Dr. Percy Shields, of Cincinnati, spent a number of months with Prof. Braun in his clinic at Zwickau studying the most recent advances in analgesia. On returning home his health failed him, but he guarded the secret closely from his family and most intimate friends. His personal diagnosis of leukemia was later corroborated by experts at Johns Hopkins.

Had Dr. Shields then elected invalidism he might have prolonged his life indefinitely; but with a true scientist's disregard of fate he plunged into the work at hand, and spent the very remnants of his vitality in accomplishing his purpose.

He spent the silent watches of the night at his desk, pen in hand, his sole companion the Grim Reaper opposite, both watching the sifting sands in the hour-glass of life. Nor did Dr. Shields falter or complain. When the pen fell from his lifeless fingers. death picked it up and wrote "Finis" to his task. He was denied even the consolation of seeing his work in print. The editing of the manuscript and proofs was completed under the friendly auspices of Dr. Otto Juettner, the medical historian.

In behalf of the world's progress one man sacrifices existence to conquer Culebra cut; another becomes a martyr to the cause of medical knowledge. It is the heroism of workaday life that transcends the glories of war and the honors of pomp and circumstance.

Would that each of us could be as one of these.

F. H. M.

Book Reviews

A carefully selected library is essential to a thorough knowledge of the science and practice of a specialty.

Anesthesia. By JAMES T. GWATHMEY, M.D. Anesthetist to the New York Skin and Cancer and Columbia Hospitals and St. Bartholomew's Clinic; President of the American Association of Anesthetists; in Collaboration with CHARLES BASKERVILLE, Ph.D., F.O.S., Professor of Chemistry and Director of Laboratories in the College of the City of New York. Octavo, 319 practical illustrations;. Cloth, $6.00. D. APPLETON & Co., New York, 1914.

The progressive practitioner, who has come to regard modern anesthesia as something more than rendering the patient insensible to pain, can certainly inform himself on the safest, most convenient and most helpful methods of administration in this recent volume of Gwathmey and Baskerville. It is an eminently practical and thoroughly exhaustive work, containing the very latest knowledge upon every form of anesthesia and analgesia, and it has been compiled with the assistance of some of the foremost experts in the United States.

As an inventor of important anesthetic apparatus, a master administrator of long service and a scientist of marked ability, Gwathmey was fully equipped to prepare a work on this vital subject, and his volume, which appears after several years of preparation, deserves to be ranked with the classics of Snow, Hewitt and Braun.

Baskerville, whose elaborate investigations have established new and higher standards of purity for anesthetic agents, has collaborated with Gwathmey in revising and preparing the chemical side of anesthesia. An interesting feature which he has supplied being a complete list of all substances ever used for anesthesia, with a full description of each.

In the preparation of this work of exhaustive scope Gwathmey has judiciously divided honors with such other renowned collaborators as Bainbridge, Crim, Elsberg, Frink, Gatch, Mitchell, Prinz, Robinovitch, Sutton and Walsh, and consequently the volume stands as a monument to the hitherto unacknowledged worth of American investigations in the science and practice of anesthesia and analgesia.

After a cursory, but interesting consideration of the Historical Evolution of Anesthesia, Gwathmey plunges into a review of all the theories on the underlying physiology of inhalation anesthesia from the original theories of Herbert Spencer to the very latest investigations of Verworn and Lillie. In this connection Gwathmey again emphasizes the value of warmed anesthetic vapors and concomitant oxygenation, factors in the successful administration of anesthetics which have now received the endorsement of almost all American as well as continental authorities.

The chapter on Rebreathing is the same masterly exposition of the subject which drew the attention of the whole profession to Gatch during his work at Johns Hopkins. It is one of the most valuable contributions ever made to present day methods of anesthetic practice.

Nitrous oxid is comprehensively dealt with particularly as regards its technic of administration and the various apparatus devised for the purpose, detailed consideration being given to the researches and technics of Hewitt, Gatch, Davis, Teter, Woolsey, Boothby and Cotton, the nasal, endo-tracheal and intra-tracheal methods being enlarged upon.

In the chapters devoted to ether and chloroform, while the drop method is described, as perfected by Ferguson, the vapor method of administration is advocated, and the superior advantages of the Gwathmey, Roth-Draeger, Pinneo and Connell devices are explained. Connell's brilliant elucidation of the surgical planes of narcosis in relation to the percentage-strengths of anesthetic vapors is given the space it deserves.

In discussing the various anesthetic technics for special operations, the value of the water vacuum aspirator and the French chair-table are illustrated and their advantages described.

The chapter devoted to treatment before, during and after anesthesia is replete with suggestions of the most practical kind and are in accord with the most recent observations and conclusions regarding acidosis.

Sutton reviews his experiences with the colonic absorption of ether-oxygen as an introduction to Gwathmey's more recent technic of oil-ether rectal anesthesia, a method that gives promise of being retained as a permanent technic for special operative procedures.

While the chapters on local anesthesia in general surgery by Mitchell and in dentistry by Prinz cannot compete in scope with such monographs as Braun and Fischer, they serve the purpose for which they were included as do the chapters devoted to mental influence in anesthesia by Walsh and hypnotism by Frink. Louise Robinovitch contributes a comprehensive treatise on electric analgesia, sleep and resuscitation, and opens up a field of research pregnant with great possibilities.

Bainbridge in his usual felicitous manner handles the subject of spinal analgesia and anesthesia with a knowledge born of long experience and routine success.

Crim's consideration of the medico-legal status of the anesthetist serves as a welcome introduction to the subject in this country and the rapidity with which decisions involving the anesthetist and his special work are accumulating, emphasize the importance of the subject.

The concluding statistics are intensely interesting as perhaps the most complete that have ever been collected, and they serve to throw some disconcerting sidelights on preconceived notions of anesthetic fatalities.

For the anesthetist who wants one book to adequately serve all his needs, this volume of Gwathmey and Baskerville certainly answers the purpose, and for the expert with a library of literature on the subject, it will be the book to which he will most frequently refer.

Text-Book of Local Anesthesia For Students and Practitioners. By PROF. DR. GEORGE HIRSCHEL, Heidelberg. With an Introductory Preface by PROF. DR. WILMS. Translated by RONALD E. S. KROHN, M.D., London. 103 illustrations in Text. WILLIAM WOOD AND CO., New York, 1914.

Local and regional anesthesia have nowadays assumed great importance in operative surgery. Commensurately with this evolution, the technic has become a procedure, demanding almost as much dexterity and experience as the operation itself. In order to assist, a plastic conception, which is the prime requisite for every conduction anesthesia, Hirschel has collated various satisfactory methods from personal and authoritative sources, and has facilitated their understanding by copious illustrations. These remarkable clear illustrations have proven a valuable aid to both Hirschel and Wilms in teaching the subject in their clinics, and they should subserve the same purpose to the intelligent reader, seeking technical information regarding the routine methods of local and regional anesthesia.

After an historical survey of the subject, Hirschel reviews the indications and contraindications for local anesthesia; discusses the preparation of the patient and the worth of the various analgesic agents, as well as the necessary instrumentarium. This general consideration is followed by a concise, yet exhaustive exposition of those technics which have proven themselves the most expedient for specific operations in all parts of the body.

The translation is exceptionally readable and the translator, Dr. Krohn, has added to the original text, the latest bibliography of the subject and a convenient index. As a practical exposition of local and regional anesthesia, exquisitely illustrated, this manual is in a class of its own.

Anesthetics. Their Uses and Administration. By DUDLEY WILMOT BUXTON, M.D., B.S., M.R.C.P., Sometime President of the Society of Anesthetists; Anesthetist and Lecturer, University College Hospital, London, etc., etc. *Fifth edition.* Small octavo; 477 pages; 84 illustrations. Philadelphia. P. BLAKISTON'S SON & Co., 1914. Price, $3.00.

A fifth edition of this standard work needs no review. To the many who are familiar with its merits it will be

sufficient to say that in this issue the author has omitted much material that has become obsolete since the last edition, and has included ample descriptions of the newer procedures of anesthesia and anelgesia, the various methods and apparatus that have made the administration of anesthetics more complicated and correspondingly more precise. He explains, for example, the rationale of Meltzer's intratracheal insufflation, illustrates several of the apparatus devised for its employment, and describes both the indication and the technic. Nitrous oxide-oxygen narcosis is accorded the space that this method has, in recent years, come to deserve. Spinal and regional anesthesia are considered at length, and many new illustrations have been introduced to make clearer their precise administration. The employment of alkaloids of opium and hyoscyamus in narcosis is also briefly reviewed. As before, the work aims to teach the scientific, rather than the routine in anesthesia methods, to establish reasons rather than mere rules.

Local Anesthesia. By DR. ARTHUR SCHLESINGER, Berlin. Translated by F. S. ARNOLD, B.A., M.B., B.CH. (Oxon). Duodecimo; 211 pages; illustrated. New York: REBMAN CO., 1914. Price, $1.50.

This small work should prove a very useful one for beginners in the field. It deals with the subject from a purely practical standpoint, so those interested in the theory or the chemistry of local anesthetics must seek detailed information elsewhere.

The work is up-to-date in nearly every respect and the logically established views of the author are clearly set forth. The only important adverse criticism that can be made of the book is that the translator has adhered too closely to the German form, and, in consequence, sentences are encountered here and there that are very ungainly or almost unintelligible.

Index and Abstracts

A Résumé of the International Current Literature of Anesthesia and Analgesia.

EDITOR'S NOTE: Authors of pertinent articles, who desire to have them indexed and abstracted, are cordially invited to send copies of the journals containing their contributions, direct to the editor, immediately on publication. Also the receipt of reprints for filing and reference will be duly appreciated.

ACAPNIA, ITS RELATION TO ANESTHESIA AND SURGERY. C. G. Parsons, Denver, Colorado Medicine, June, 1914.

ADMINISTRATION OF AN ANESTHETIC (CHLOROFORM). Bernard Higham, Rawal Pindi, India, Indian Medical Gazette, also Medical Brief, July, 1914.

AFTER-PAIN FOLLOWING OPERATIONS UNDER LOCAL ANALGESIA. A. Schlesinger, London, Deutsche Medizinische Wochenschrift, April 16, 1914.

AFTER-PAIN WITH LOCAL ANALGESIA. F. Honigmann, Zentralblatt ful Chirurgie, Leipsic, February 7, 1914.

ALYPIN, TOXIC LIMIT OF. L. Lichtenstein, Therapie der Gegenwart, Berlin, February, 1914.

ANESTHESIA. L. Frank, Louisville, Kentucky State Medical Journal, March 15, 1914.

ANESTHETICS, ANESTHESIA AND THE ANESTHETIST. G. T. McCauliff, Webster City, Iowa State Medical Society Journal, February, 1914.

ANESTHETICS. W. N. Lynn, Knoxville, Tennessee State Medical Association Journal, February, 1914.

ANESTHETISTS, DUTIES OF. E. F. Horine, Louisville, Kentucky Medical Journal, May 15, 1914.

ANESTHETIST, DIFFICULTIES WITH WHICH HE HAS TO CONTEND. R. W. Hornabrook, Practitioner, London, June, 1914.

ANESTHETIC AGENTS, OUR GENERAL, ETHER AND NITROUS OXID. W. C. Woolsey, Brooklyn, Long Island Medical Journal, February, 1914.

ANESTHETIST, STANDARD EDUCATIONAL QUALIFICATIONS FOR THE. R. C. Coburn, New York, Medical Record, February 21, 1914.

Anesthetics and Diagnosis. J. BLUMFELD, *Lancet*, March 28.

In a lecture delivered at the Medical Graduates' College and Polyclinic, Blumfeld lays stress on the fact that the administration of an anesthetic may be the chief step in making a correct diagnosis, not merely by allowing of an examination which was previously impossible without it, but also by providing fresh symptoms through the observed behavior of the patient during anesthesia. On one occasion, Blumfeld saw respiratory trouble arising during anesthesia, led to the detection of a mediastinal tumor, which had caused no symptoms in the conscious patient.

An examination with the abdominal wall thoroughly relaxed and just previous to operation, will often enable the surgeon to modify his preliminary diagnosis as to the organ affected or the location of tumor masses. It is inconvenient to make a gridiron incision for apendectomy and find a carcinoma of the sigmoid that can be removed only through another incision.

Again, it is frequently possible under an anesthetic to make out secondary deposits that preclude a successful operative interference, and also to differentiate carcinoma of the transverse colon from an enlarged gall-bladder.

While phantom tumors may enlarge during the excitement stage of anesthesia, they slowly melt away under the examining hand, when a plane of surgical narcosis has been reached.

Blumfeld draws attention to this unique point of differential diagnostic significance, that under anesthesia, particularly in chronic cases coming to operation, the pathological seat of trouble will be found under that part of the abdominal wall where rigidity persists. Thus he has seen duodenal ulcer differentiated from appendicitis, and the correct incision made after an examination under deep narcosis, during which the upper portion of the rectus muscle remained rigid in spite of the anesthetic. He suggests that in such instances portions of the muscle may undergo fibrotic changes as a protective action on the part of nature.

He quotes a personal observation in which under an anesthetic a gynecologist changed his diagnosis from an ovarian cyst complicating pregnancy, to a cyst complicating a fibroid tumor, the cyst, remarkable to say, having been considered the pregnant uterus.

Respiratory trouble under anesthesia in another gynecological case led to the discovery of a band attached to the cervix, which made traction upon a certain portion of the cul-de-sac and caused considerable pain to the conscious patient.

Blumfeld also reiterates the importance of examinations under an anesthetic in hemorrhage from the vagina or rectum in order to rule out carcinoma.

ANESTHETIC TENSION OF ETHER VAPOR IN MAN, DETERMINATION OF. Mode of Action of Common Volatile Anesthetics. W. M. Boothby, Boston, Journal of Pharmacology and Experimental Therapeutics, March, 1914.

ANESTHETIZATION,—ANESTHETIZER AND SURGEON. R. L. Charles, Denver, Colorado Medicine, June, 1914.

ANOCI-ASSOCIATION. (Weitere Erfahrungen mit Kombinierten Narkosen). P. Sick, Deutsche Zeitschrift fur Chirurgie, cxxviii, Nos. 3-4.

ANOCI-ASSOCIATION, TECHNIC AND RESULTS OF. H. G. Sloan, Cleveland, Lancet-Clinic, January 3, 1914.

ANOCI-ASSOCIATION AND CANCER OF THE CHEEK. E. W. C. Bradfield, Indian Medical Gazette, April, 1914.

ANOCI-ASSOCIATION — PREVENTION OF SHOCK AND POST-OPERATIVE PAIN. A. B. Cooke, Los Angeles, Journal American Medical Association, June 6, 1914.

ANOCITHESIA—PAINLESS SURGERY. C. A. L. Reed, Cincinnati, Medical Record, March 7, 1914.

Anoci-Association in Its Relation to Operations on the Billiary Tract and Stomach. (Illustrated.) GEORGE W. CRILE, Cleveland. *The Ohio State Medical Journal,* July, 1914.

Impairment of liver function due to pathological states of the stomach or billiary passages, which require operation under an anesthetic, may result in a metabolic quicksand, indicated by increasing apathy, somnolence progressing to unconsciousness and death of the patient. From exhaustive laboratory experiments Crile has concluded that the brain, adrenals and liver are mutually dependent upon each other in the conversion of latent into kinetic energy. The functional activity of the liver depends on a simultaneous harmone action and sympathetic nerve stimulation. Operative trauma readily blocks this sympathetic nerve stimulation, resulting in temporary loss of liver function, and jeopardizing the patient's post-operative recovery.

In handling these hazardous risks anoci-association enables the operator to preserve and perchance widen the slender margin of safety. Preoperative medication should be used to minimize or prevent emotional excitement. Nitrous oxid-oxygen should be the anesthetic of choice, since it does not impair immunity, as does ether.

Regional analgesia with novocain should precede every division of nerve-bearing tissue; manipulative trauma should be minimized and sharp, bloodless dissection used; post-operative pain should be controlled by quinine and urea hydrochlorid injected at a distance from the line of incision, but including the entire area of operation; the sick-room environment should be made cheerful and hopeful, and narcotics should be used to control post-operative pain and undue psychic strain.

Laboratory experiments backed by clinical results have convinced Crile that deep morphinization will measurably protect the brain, the suprarenals and the liver against operative trauma and against infection. Morphia given, not in one dose, but in repeated doses, will conserve the functional activity of the vital organs and prevent the supervention of a destructive metabolic process that will jeopardize the life of a hazardous risk.

Anoci-Association: The Needlessness of Combined General and Local Anesthesia as Shown in the Results of the Last 1,000 Cases Admitted to the Gynecological Department of the Howard Hospital. BARTON COOKE HIRST, Philadelphia, *American Journal of Obstetrics,* April, 1914.

Hirst raises the question of the accuracy of hospital statistics in reference to Crile's reported mortality of 0.8 per cent in 1000 cases under anoci-association. Comparing his own statistics in the last 1000 cases operated on in the Gynecological Department of Howard Hospital, he finds a mortality of 1.5 per cent, or fifteen deaths. Excluding one ether death on the table before operation was begun, an unfortunate occurrence to two of the resident physicians, the other fatalities were due to advanced cancer, tuberculosis or sepsis, and excluding the hopeless risks, the mortality would be reduced to 0.6.

This fact questions the advisability of combined general and local anesthesia as a routine procedure, particularly when the factors of the loss of vitality due to the prolonged operative time and the incidence of suppurating wounds are considered.

APPARATUS, PORTABLE NITROUS OXID-OXYGEN. S. W. Moorhead, Philadelphia, Journal American Medical Association, April 25, 1914.

APPARATUS FOR USE IN OPERATIONS ON THE OPEN THORAX. C. A. Ewald, Seattle, Boston Medical and Surgical Journal, April 9, 1914.

APPARATUS, NITROUS OXID-OXYGEN-ETHER, PREVIOUSLY UNEMPHASIZED FEATURE IN THE CONSTRUCTION OF. P. J. Flagg, New York City, Journal American Medical Association, January 3, 1914.

APPARATUS FOR INTRATRACHEAL INSUFFLATION. J. P. Pratt, Baltimore, Journal American Medical Association, January 3, 1914.

APPARATUS—IMPROVED FACE MASK. W. L. and C. P. Brown, El Paso, Journal American Medical Association, April 25, 1914.

APPARATUS, SIMPLE AND COMPLETE FORMS OF, FOR INTRATRACHEAL ANESTHESIA. H. H. Janeway, New York, Annals of Surgery, April, 1914.

Apparatus—Ether Vaporizer, an Inexpensive and Simple. PAUL B. COBLE, Indianapolis, *Journal Indiana State Medical Association,* March 15, 1914.

In his apparatus Coble obviates the administration of moist ether vapor, and the danger of forcing liquid ether into the mouth or naso-pharynx, by surrounding his ether generator and the separate vapor chamber with water jackets, instead of passing the vapor through the hot water itself.

In order to obtain the desired results from etherization by the vapor method it is necessary to watch a few details. The metal tubing on the mouth-gag, mouth piece or mask, must be of sufficient caliber to permit a ready flow. The anesthetist must use a continuous flow of vapor, and not try to give it merely during inspiration. In tonsil and adenoid work particularly about one-half of the vapor is lost, being blown away by expiration. Covering the mouth or occluding the nares for a few inspirations will deepen narcosis as desired.

AURAL SURGERY, ANESTHESIA IN. W. G. Doran, New York. Laryngoscope, June, 1914.

BLOCKING THE INFERIOR MAXILLARY NERVE AT THE FORAMEN OVALE. F. Bonola, Policlinico, April, 1914.

BLOCKING THE SYMPATHETIC TO PREVENT SHOCK IN COMBINED OPERATIONS FOR CANCER OF THE RECTUM OR RECTO-SIGMOIDAL JUNCTURE. Jerome M. Lynch, New York, American Journal of Obstetrics, February, 1914.

BLOOD-PRESSURE, VARIABILITY OF AND VASOMOTOR IRRITABILITY OF ANESTHETIZED DOG. R. S. Hoskins and H. Wheelon, Chicago, American Journal of Physiology, April, 1914.

BLOOD-PRESSURE, COMPARISON OF ACTION OF CHLOROFORM AND ETHER ON. H. P. Fairlie, London, Lancet, February 21, 1914.

BUBO OPERATIONS, LOCAL ANESTHESIA IN. S. Honna and M. Kitagawa, Tokyo, Sei-I-Kwai Medical Journal, June 6, 1914.

BRACHIAL PLEXUS ANALGESIA AND ITS COMPLICATIONS. F. Hartel and W. Keppler, Archives fur Klinische Chirurgie, ciii, No. 1.

BRACHIAL PLEXUS—SUPRACLAVICULAR ANESTHETIZATION OF; CASE OF COLLAPSE FOLLOWING ITS ADMINISTRATION. H. Neuhof, New York, Journal American Medical Association, May 23, 1914.

Brachial Plexus Anesthesia: Complete Local Analgesia, Permitting of all Major Operations on the Upper Extremity. A. STRACHAUER, *Minneapolis Journal-Lancet,* June 1.

Strachauer prefers the technic of Kulenkampff, who in 1911 successfully induced brachial plexus analgesia on his own body. The patient is seated with the head turned away from the side to be injected. In favorable cases the plexus can be palpated in the inferior cervical triangle as it crosses the first rib. The needle is introduced above the middle of the clavicle external to the pulsation of the subclavian artery, and is pushed inward and downward toward the spinous process of the third dorsal vertebra. The needle should be 6 cm. long. Parasthetic sensations in the hand and arm indicate that the plexus has been reached. Twenty cc. of a 2 per cent. solution of novocain and suparenin, in isotonic saline at body temperature, are injected. Parasthesia increases momentarily and then analgesia supervenes in from three to ten minutes, and lasts for one to two hours. The analgesia is sufficiently complete for any major operation on the upper extremity, except that in shoulder operations additional subdermal blocking of the cutaneous nerves is necessary.

Brachial plexus anesthesia is an ideal method for the reduction of old dislocations and fractures on account of the perfect relaxation obtained.

CALLIBRATION OF WALLER GAS BALANCE AND CONNELL ANESTHETOMETER. W. M. Boothby and I. Sanford, Boston, Journal of Pharmacology and Experimental Therapeutics, March, 1914.

CELL-DIVISION, ACTION OF ANESTHETICS IN SUPPRESSING. R. S. Lillie, Woods Hole, Mass., Journal of Biological Chemistry, March, 1914.

CHLOROFORM ANESTHESIA IN THE LIGHT OF PHYSIOLOGICAL RESEARCH. G. H. Clark, Glasgow Medical Journal, January, 1914.

CHLOROFORM TOXICITY AND HEPATIC NECROSIS, INFLUENCE OF DIET ON. E. I. Opie and L. B. Alford, St. Louis, Journal American Medical Association, March 21, 1914.

COUNTRY PRACTITIONER, ANESTHESIA FROM THE STANDPOINT OF. J. F. Auner, Waverly, Iowa, State Medical Society Journal, June, 1914.

Cocaine, Dosage of, and Other Drugs Used For Local Analgesia. A. H. MILLER, Providence, *R. I., The Journal of the American Medical Association,* January 17.

Miller reported 103 cases to the Providence, R. I., Society of Anesthetists, in which alypin had been used as a local analgesic. Of these, thirty-five were minor surgical operations and sixty-eight genito-urinary. In one hundred of the cases analgesia was perfectly satisfactory, in two the analgesic caused serious difficulty and in one instance death. In the last case the patient was an apparently healthy adult, thirty-nine years of age, who was about to undergo dilatation for stricture of the urethra. About two drachms of a 10 per cent. solution of alypin were introduced into the urethra and bladder. Two minutes later he had a general convulsion. A half-dozen similar convulsions occurred during the next ten minutes, with cessation of respiration and stopping of the pulse. Artificial respiration and stimulation were tried without avail.

In another instance an adult was about to have sounds passed for retention of urine. An unmeasured quantity of a 10 per cent. solution of alypin was introduced into the urethra. In about five minutes the patient had a general convulsion, respiration ceased and the pulse became imperceptible. The patient was revived after about two hours' work. In the third untoward case about one and a half drachms of a 10 per cent. solution of alypin was introduced into the urethra and bladder for dilitation of a stricture. In three minutes the patient became unconscious, and respiration became embarassed, but the pulse remained good. Artificial respiration and inhalations of oxygen brought this patient around in about ten minutes.

These experiences emphasize the necessity for great care in the dosage of local analgesics. High percentage solutions are always dangerous. A fact that urologists overlook is the extremely rapid absorption of local analgesic drugs from the urethra and bladder into the general circulation. Those interested should try a liberal dose of adrenalin or eserine per urethra to note this peculiar rapidity of absorption and the disastrous systemic effects of potent drugs thus administered.

With regard to alypin, Bremmermann's technic of depositing a tablet of the drug at the point of analgesic localization is far preferable to throwing an unmeasured quantity of the 10 per cent. solution into the urethra or bladder.

DEATHS AND FATALITIES, SECONDARY ANESTHETIC. George Keil, Deutsche Medizinische Wochenschrift, May 14, 1914.

(DEATHS) SURGICAL MORTALITY FROM STANDPOINT OF THE ANESTHETIST. H. W. Kearney, Washington, D. C. Washington Medical Annals, May, 1914.

(DEATHS) ANESTHETIC FATALITIES AND INJURIES, MEANS OF LESSENING.. R. F. Patterson, Nashville, Tennessee, State Medical Association Journal, February, 1914.

DEATH DURING ETHER ANESTHESIA, STATUS LYMPHATICUS. W. B. Howell, Montreal, Canada, Journal American Medical Association, March 28, 1914.

Deaths During Anesthesia, a Review of Inquests Concerning. R. FLEMMING, London, *Proceedings of the Royal Society of Medicine,* Section of Anesthetics, vol. vii, 1914.

Flemming has collected data regarding all instances of death under anesthesia reported in the English press from 1910-1913. The statistics are therefore far from complete. Of 700 cases recorded, the nature of the anesthetic used was ascertained in 542; in 521 of which the anesthetic seemed to have been more or less responsible in the causation of death. In 223 cases death is reported to have occurred before operation was begun. In at least 100 cases the severity of the operative interference was a factor in the consequent fatality.

Deaths from certain anesthetics occurred as follows: Chloroform, 378; Ether, 28; Mixtures, 100; Nitrous Oxide, 12; Ethyl Chloride, 6; Spinal, 8; Scopolamine, 2; Hedonal, 2; Local, 6; not specified, 158.

Among 338 persons the age ranged between twenty-six and sixty; in the remaining 124 it varied between six and fifteen.

Perhaps the only tenable conclusion that can be drawn from Flemming's data is the fact that chloroform is extremely fatal during the induction period of narcosis. The recent popularity of the drop method of etherization in England and on the Continent may soon modify statistics so that further deductions may be drawn.

Erroneous Deductions From Tracheal Insufflation. RAYMOND C. COBURN, New York City, *New York Medical Journal,* June 20, 1914.

Coburn contends that less shock follows operations performed under insufflated ether, not because the latter protects better against shock than inhaled ether, but because tracheal insufflation relieves the extra burden thrown upon respiration, thereby conserving vitality. Crile's researches show that while neither ether nor nitrous oxide cause shock per se, still in the presence of trauma, brain cell exhaustion under ether is three times that which occurs under nitrous oxide anesthesia in the normal subject, and the proportion is greater in handicapped risks. Also ether by inhalation technics directly devitalizes the patient through respiratory restriction, and by the dissolving of the lipoid in the cells of the blood, thereby embarrassing the eliminating and disintoxicating organs—the liver, kidneys, spleen, thyroid and adrenals.

Clinical experiences at Johns Hopkins prove conclusively that warm anesthetic vapor tends to conserve both the life and vitality of patients.

While indicators may be a guide in adjusting the apparent oxygen percentage in any given technic of administration, the proper degree of oxygenation and proper depth of anesthesia are the real factors that control the percentage adjustment.

Tracheal insufflation with increased pulmonary aeration without shock has led many observers to argue that acapnia is not a cause of shock.

While the increased intrapulmonary pressure of tracheal insufflation increases the alveolar oxygen tension, thereby facilitating oxygenation, the alveolar carbon dioxide tension is unaffected, as its percentage varies inversely with this pressure, and is not decreased unless there is an increase of alveolar ventilation. Intratracheal insufflation really produces a hypercapnia, necessitating, according to Meltzer's technic periodic interruptions, to partially deflate the lungs and thus increase alveolar ventilation, thereby removing the excess of accumulated carbon dioxide.

ETHER ANESTHESIA. W. C. Huyser, Kalamazoo. Michigan State Society Journal, June, 1914.

ETHER ANESTHESIA BY THE OPEN METHOD. F. R. Widdowson, Philadelphia. New Jersey State Medical Society Journal, May, 1914.

ETHER INHALATION, EFFECT OF ON SKELETAL MOTOR MECHANISM. S. J. Meltzer and J. Auer, Journal of Pharmacology and Experimental Therapeutics, May, 1914.

EYE AND FACE OPERATIONS UNDER REGIONAL ANESTHESIA. R. and M. Danis, Brussels. Ophthalmology, January, 1914.

(EYE) LOCAL ANALGESIA TO COMBAT PHOTOPHOBIA COMPLICATING CONJUNCTIVITIS ECZEMATOSA. H. Peterka, Munchener Medizinische Wochenschrift, June 2, 1914.

FRACTURES OF THE LOWER EXTREMITY, REGIONAL ANALGESIA FOR. (Regionäre Anästhesierung bei Frakturen der unteren Extremität.) P. Babitzki, Deutsche Medizinische Wochenschrift, February 12, 1914.

Hemorrhoids, Their Radical Treatment Under Local Analgesia. E. H. TERRELL, Richmond, Va. *Virginia Medical Semi-Monthly*, April 24, 1914.

Terrell was led to use the ambulant radical treatment of hemorrhoids under local analgesia because so many patients refused to submit to a general anesthetic and as many more could not jeopardize their employment by going to a hospital for the classical operation. While the methods has its limitations, its applicability is especially demonstrated in those long-standing cases of hemorrhoids, which protrude easily and have to be frequently replaced.

When the sphincters are irritable or the parts acutely inflamed, preliminary treatment is necessary before removal is attempted. If, however, the sphincter cannot be sufficiently dilated without excessive pain, Terrell uses the electric vibrator to overcome the spasm, and finds this technic of dilatation practically painless.

All ambulatory cases are operated in the office, preferably on Saturday, so that they may enjoy a Sunday's rest before returning to work, although this is not essential. When ready to operate the largest, accessible pile is first selected. This is brought down, cleansed with a mild antiseptic solution, and infiltrated with a solution containing one per cent quinine and urea hydrochloride, and about 1-10 per cent novocain. A clamp is then applied and ligatures placed in two or more sections, depending on the size of the pile. Fine linen is used for this purpose. The superior ligature is the most important as it controls the main blood supply. With a pair of sharp, curved scissors the pile is cut off close to the ligatures, leaving only sufficient tissue to prevent slipping. If there is no undue bleeding the stump is returned above the sphincters.

The patient should lie down for a while before going home or resuming the day's occupation. Patients treated in this way seldom complain of pain, although occasionally there is a slight throbbing sensation for a few hours. The prolonged obtunding effect of the quinine and urea is enough to keep the patient comfortable.

The procedure is repeated at intervals of from five days to a week until the radical cure is accomplished.

Two points in technic are emphasized: (a) no cutaneous tissue should ever be included in the ligatures; and (b) Hilton's white line is the most sensitive and irritable portion of the anal canal, and therefore must be deeply anesthetized and carefully manipulated to avoid trauma.

HERNIA, LOCAL ANESTHESIA WITH SPECIAL REFERENCE TO. C. W. Allen, New Orleans. Texas State Journal of Medicine, March, 1914.

High Pressure Analgesia. W. T. JACKMAN, Cleveland. *The Dental Summary*, May, 1914.

Jackman considers high pressure analgesia the preferable method for completely obtunding the tooth for painless preparation of the sensitive cavity. His technic is as follows:

The gums in the immediate region of the prospective operation should be desensitized with an aqueous 5 per cent solution of cocain, applied on a cotton swab with considerable pressure, after which the rubber dam is adjusted. With a No. 3 round bur, a pit not over one-third the depth of the enamel is made over healthy dentin, on either side of the buccal cavity, or preferably below it, if possible. This pit is slightly deepened with a No. ½ round bur without perforating the enamel. This preliminary drilling at low speed is painless. A Myers syringe with forceps handles and locking device is filled with a 2 per cent aqueous solution of cocain. Grasping the handles, dagger-fashion, the operator stands behind and to the right of the patient, passing the left arm around the patient's head, and placing the second, third and fourth fingers of the left hand under the patient's mandible near the chin, with the index finger against the tooth to be operated on, for counter-pressure.

Having passed the syringe through the flame of the alcohol lamp, the needle is placed in the previously prepared pit, pressing slightly, and the handles are then closed. The rapidity with which the tooth will be obtunded will be in proportion as the contact is relatively perfect.

Having obtained perfect contact, an application of thirty seconds is usually required to force the solution through the remaining portion of the enamel and into the dentin, which may now be entered with a No. ½ bur without pain. Pressure is continued for ninety seconds longer to sufficiently obtund the remaining pulp. If sensation persists use the pressure for a few seconds longer.

Five years' clinical test of the method has convinced Jackman that high pressure analgesia with a 2 per cent solution does not act destructively on the pulp tissue. In fact, the analgesia prevents necrosis due to shock and the trauma of malleting, although it can in no way influence the injurious effects of excessive heat by rapid boring.

For the removal of the pulp, its condition is always a factor in determining the length of time high pressure analgesia should be used, two to two and a half minutes being the routine duration. If congestion has reached the stage of stasis, no method of analgesia will obtund the pulp. The presence of curly dentin contraindicates the method as it is ineffective in this condition, just as it is dangerous in the preparation of carious cavities, in which case ptomaines may be forced into the pulp, resulting in its ultimate destruction.

HOSPITAL ANESTHESIA, RECENT METHODS IN. C. N. Chipman, Washington, D. C. Kentucky State Medical Journal, June 1, 1914.

Hysterical Monoplegia Following Electric Shock Cured Under Anesthesia. P. STEWART, *British Medical Journal*, March 7.

This remarkable cure occurred in a young adult who had suffered an hysterical monoplegia following electric shock, after all other methods of therapy had been tried without success. Six months after the time of the accident the patient was anesthetized, and the excitement stage of etherization was unduly prolonged, and during this period the functional activity of the arm involved was restored.

INTRAVENOUS ANESTHESIA. C. L. Candler, Detroit. Michigan State Medical Society Journal, June, 1914.

INTRAVENOUS ANESTHESIA WITH HEDONAL, EXPERIMENTAL RESEARCHES ON. N. Berenesgowsky, Archiv fur Klinische Chirurgie, cii, No. 1.

INTRATRACHEAL ANESTHESIA, MODIFIED TECHNIC FOR. E. Jeger, Deutsche Medizinische Wochenschrift, January 29, 1914.

INTRATRACHEAL ANESTHESIA. S. Pope, San Francisco, California. State Journal of Medicine, March, 1914.

Intratracheal Insufflation, Proper Depth of the Tube in. S. J. MELTZER, Rockefeller Institute. *The Journal of the American Medical Association*, May 16.

In first describing the procedure of intratracheal insufflation for anesthesia during intrathoracic surgery, Metlzer advocated the introduction of the tube until it met an obstruction and then suggested its withdrawal about an inch, which would bring it to the level of the bifurcation. The obstruction thus encountered was the lumen of the bronchus, not the bronchial partition at the bifurcation. This fact is of diagnostic significance. Some surgeons and anesthetists as a routine practice have simply accustomed themselves to introducing the tube to a depth of 27 cm. This practice may lead to error. Neither the cough reflex, nor the rhythmic expiratory and inspiratory changes of air pressure at the mouth of the catheter are absolute indications that the tube is in the trachea. A similar reflex and respiratory phenomena occurs also with the tube inadvertently introduced into the esophagus. Metlzer has witnessed two instances of this kind, in which there was no air distention of the stomach, and in which the escape of the ether-ladened air upward resulted in a pharyngeal form of anesthesia.

The fact that anesthesia may be maintained with the tube in the esophagus emphasizes the necessity for avoiding this contretemps, as the aspiration of blood and mucus would be facilitated instead of prevented, as it is in the proper technic.

A reliable evidence that the catheter is in the trachea is the encountering of an undoubted resistance while pushing the catheter downward. If the catheter can be pushed beyond a depth exceeding 33 cm. it has been introduced into the esophagus.

To obviate this mistake Metlzer suggests that the catheter be marked at two points, 27 cm. and 35 cm., respectively; that the tube be introduced until it meets an obstruction at or near the 35 cm. mark, and then be withdrawn to the 27 cm. mark, and that the routine practice of introducing the tube only to a place above the tracheal bifurcation, without differentiating its real situation, be discontinued.

In conclusion Metlzer points out the disadvantages of the catheter with lateral openings as against the increased efficiency of the tube with the opening at the end.

ISOPRAL RECTAL ANESTHESIA, DANGERS OF. P. Kleinschmidt, Berliner Klinische Wochenschrift, February 2, 1914.

KIDNEYS, ACTION OF SPINAL ANESTHESIA ON. R. Mosti, Gazetta degli Ospedali e delle Kliniche, Milan, XXXV, Nos. 30-33.

Larynx, A Method of Anesthetizing. COURTENAY YORKE, Liverpool, *British Medical Journal*, June 13, 1914.

Anesthesia of the larynx by novocain injections around the internal laryngeal nerves is of value when cocaine alone will not induce complete anesthesia, as in inflammatory and highly irritable conditions of the larynx; when deep anesthesia is required for actual cauterization, and when the patient is unduly sensitive to the toxic properties of cocaine.

The method was originally proposed by Frey in 1906, and Yorke has used a modified technic in 55 cases, including 9 with new growths of the larynx, 2 with singer's nodes, 2 with lupus, and the remainder with tuberculous laryngitis requiring the use of the actual cautery.

A preliminary hypodermic injection of morphine and atropine is advisable, and the palate, fauces, pharynx and base of the tongue are desensitized by the usual application of cocaine. A hypersensitive palate requires novocain injections in the neighborhood of the posterior palatine foramina, and the recalcitrant epiglottis and base of the tongue may be controlled by injections just above the hyoid.

Post-mortem dissections have convinced Yorke that previous methods are uncertain for anatomical reasons. Thrusting the needle in at right angles to the surface in an effort to reach the internal laryngeal nerve as it lies on the thyro-hyoid membrane just before piercing that structure, makes it difficult to locate the plane of the nerve, and places the great vessels in danger of puncture.

Yorke directs the needle along the course of the nerve from the point where it pierces the thyro-hyoid membrane to a point half an inch below the upper border of the thyroid cartilage. The solution is injected during the progress of the needle, and in this technic one inch or more of the nerve in a position easily accessible, is brought under the effect of the novocain.

To get the needle into the plane of the nerve it is entered so as to strike the great cornu of the hyoid one inch behind the lesser cornu; the point is slightly depressed until it hitches against the lower border of the great cornu, where it is in relation with the uncovered area of the thyro-hyoid membrane, and in a position to commence the downward and forward movement along the nerve.

There is very little likelihood of the needle entering the pharynx, until it sinks beneath the upper border of the thyroid, in which location it is important to keep in front of the sinus pyriformis. In the male, Yorke has found that the sinus pyriformis is one to one and a quarter, and in the female three-quarters to an inch from the middle line of the neck.

During the injection the patient lies in the recumbent position with the neck well extended to open up the thyro-hyoid interval. A strong, sharply pointed needle, two and a half inches long, is employed, and the fluid used is a 5 per cent aqueous solution of novocain, to which a small quantity of adrenal is added. Twenty to thirty m. of this solution are injected into both sides. Quinine and urea hydrochloride similarly used has proved disappointing.

In the 55 cases thus anesthetized there was no hemorrhage or inflammatory reaction. The large vessels, if pressed back with the thumb are quite out of danger, and with aseptic precautions the risk of infection is insignificant.

LEGAL STATUS OF TRAINED NURSES IN ADMINISTRATION OF ANESTHETICS. A. C. Vandiver, New York Medical Journal, May 30, 1914.

LOCAL ANESTHETICS IN SURGICAL PRACTICE. D. Pellegrino, Rome, Policlinico, February 15, 1914.

LOCAL ANESTHESIA. R. Duffy, Plant City, Fla. Georgia Medical Association Journal, May, 1914.

Magnesium Narcosis, Investigation of. (*Untersuchungen über die Magnesiumnarkose.*) E. STARKENSTEIN, *Centralblat fur Physiologie*, XXVIII, 1914.

Since the initial laboratory and clinical researches of Metlzer and Auer on anesthesia following the injection of magnesium salts, it has been a disputed point whether the phenomena observed was a true narcosis of central origin or a profound paralysis involving the peripheral nervous system. Combined in doses insufficient of themselves to induce anesthesia, Metlzer and Auer found that magnesium and ether would produce narcosis without any evidence of peripheral paralysis. More recently Starkenstein has found that the irritability of the entire nervous system is depressed by magnesium ions. This is in line with the latest observations of Meltzer and Auer that the decreased capacity of the skeletal motor mechanism to produce tetanus under ether anesthesia is in reality an increase of fatigability, more noticeable in nerve stimulation than in direct stimulation of the musculature, thereby indicating a curare-like action. Further investigation of Githens and Meltzer have shown that the toxic action on the peripheral respiratory mechanism begins in the earlier stages of etherization, and that the phrenic nerve and the diaphragm lose a great deal of their irritability in the course of prolonged ether narcosis.

Primarily chloroform does not produce this same effect. The irritability of motor nerves to faradic stimulation persists, independently of the length of narcosis, under chloroform, unless the heart becomes profoundly affected from an overdosage or secondary complications such as anemia or asphyxia are present.

MENTAL AND INFRA-ORBITAL NERVES, BLOCKING OF, AT THEIR FORAMINA TO INDUCE OPERATIVE ANALGESIA IN THEIR CUTANEOUS DISTRIBUTION. P. G. Skillern, Jr., Philadelphia. Surgery, Gynecology and Obstetrics, March, 1914.

MOTOR NERVES, IRRITABILITY OF UNDER CHLOROFORM ANESTHESIA. T. S. Githens and S. J. Metlzer, Journal of Pharmacology and Experimental Therapeutics, May, 1914.

NITROUS OXID-OXYGEN NOVOCAIN ANESTHESIA. W. E. Bannen, La Crosse, Wisconsin Medical Journal, May, 1914.

NITROUS OXID ANESTHESIA. H. M. Decker, Davenport, Iowa, Ibid.

NITROUS OXID-OXYGEN ANESTHESIA. A. H. Miller, Providence, R. I. New York Medical Journal, January 24, 1914.

Nitrous Oxid-Oxygen Analgesia. MOSES SALZER, Cincinnati, O. *The Dental Summary*, June, 1914.

Salzer points out the futility of attempting analgesia with nitrous oxid-oxygen alone in patients who are excessively nervous and do not want to be conscious of what is going on. Until they have been educated to the efficiency of gas-oxygen analgesia by several experiences, they should receive some preliminary medication as morphin, hyoscin or bromides.

In all cases in which pain, caused by the dental manipulation itself, is responsible for the patient's dread or nervousness, gas-oxygen amalgesia is marvellously efficient.

Salzer is doubtful of the ability of the average dentist to operate and maintain analgesia at the same time, without an assistant, even when using the various automatic apparatuses on the market. Unless the assistant is an expert anesthetist or the dentist himself is unusually skillful, the analgesia is apt to be irregular, and may lapse into anesthesia, in which unpleasant dreams may supervene, the memory of which may remain, causing a lasting shock to the nervous system, or may be misinterpreted, thus seriously compromising the operator.

The amount of nitrous oxid and oxygen necessary for satisfactory analgesia must be guaged wholly and solely by the patient's sensation, and inasmuch as the sense of hearing is the last of the special senses to be obtunded, short of anesthesia, answers to questions may be utilized as an indication of the depth of analgesia. Reflexes of spinal origin are entirely independent of the perception of pain and may occur under deep nitrous oxid-oxygen anesthesia. While they may inconvenience the operator they are no indication that the analgesia is not satisfactory.

Salzer concludes his article by recounting the personal experiences of a psychologist and a physician under analgesia for dental operations.

The psychologist found that he could readily control the depth of analgesia by deepening his breathing of the gases, and he was highly amused by the thought that it would be quite a joke on the doctors if he reached a point where he could not respond to their instructions to indicate sensations of pain by raising his hand, but could nevertheless still feel the pain.

The physician also found that he could control the depth of analgesia by deepening his breathing, and he was particularly impressed by the clear line of demarkation that separated the realization of outside impressions, such as surroundings and pain, from reasoning ability. Throughout the entire analgesia he was able to reason clearly and make mental note of his sensations to report them to the anesthetist. Confusion was only noticeable when the gases were discontinued and all the mental processes re-established themselves with "confusing rapidity."

NON-MEDICAL ANESTHETISTS. Lawrence Irwell, Buffalo, New York. State Journal of Medicine, March, 1914.

NOSE AND THROAT SURGERY, QUININE AND UREA HYDROCHLORIDE IN. A. J. Herzig, New York Medical Journal, March 14, 1914.

NOVOCAIN AS A LOCAL ANALGESIC (Mayo Clinic). D. C. Balfour, St. Paul Medical Journal, February, 1914.

OIL-ETHER ANESTHESIA. James T. Gwathmey, New York. New York Medical Journal, January 31, 1914. Technic of, Ibid, March 21, 1914.

OIL-ETHER ANESTHESIA. J. C. Plate, Valdosta, Georgia, Medical Association Journal, February, 1914.

OIL-ETHER COLONIC ANESTHESIA. W. W. Spargo, Albuquerque, New Mexico Medical Journal, July, 1914.

OIL-ETHER COLONIC ANESTHESIA: 500 SUCCESSFUL ADMINISTRATIONS. James T. Gwathmey, American Journal of Surgery, July, 1914.

Oil-Ether Rectal Anesthesia: Some Theoretical Considerations. H. CLIFTON LUKE, New York, *Medical Record*, May 9, 1914.

Gwathmey's revival of rectal or colonic anesthesia by the new oil-ether technic leads Luke to propound some theoretical considerations. Luke maintains that the method is not exact because the entire dosage is estimated and placed in the colon for absorption before the length of time of the operation is known, and while the patient's susceptibility to ether is problematical, the patient's age and the rapidity of absorption, particularly in the Trendelenburg posture, are also factors in inaccuracy, while the remnants of oil-ether left in the bowel after the post-operative enema may prolong recovery from the anesthetic.

That in its absorption the ether does not carry intestinal toxines into the circulation is as yet to be proven. Also the anesthetic, by this method, reaches the vital centers circuitously, as it first enters the venous blood and passes through the portal circulation before reaching the right heart and lungs. Furthermore the method predisposes to pulmonary depression and does not obviate aspiration, as does intratracheal insufflation, and opens the way to post-anesthetic pneumonias.

Clinically Luke objects to the method because of the exhaustion associated with the special rectal preparation required; the occasional necessity of prostoscopic examination as a matter of precaution; the occurrence of cramps during the induction period, which is frequently prolonged, and must often be aided by inhalation narcosis; the slow or abrupt onset of respiratory depression, followed by the arrest of breathing, loss of muscular tone, dilated pupils and the possibility of fatal syncope; the occurrence of proctitis or colitis post-operatively, delayed recovery, and increased toxemia.

Pantopon-Scopolamine as an Adjunct to Local Analgesia in Opthalmic Surgery. A. MAITLAND RAMSAY, *Lancet*, April 25.

Ramsay reports very satisfactory results from the use of pantopon-scopolamine as an adjunct to local analgesia in routine opthalmic operative procedures. Pantopon was introduced by Prof. Sahli, director of the Medical Clinic at Berne, and it contains all the alkaloids of opium as solube hydrochlorides in the same proportions as in the crude drug. The average dose of the combination is 2-3 gr. pantopon and 1-150 gr. scopolamine.

Ramsay's attention was attracted to the combination by Gray's report of its efficacy as an adjunct to local analgesia. (*Lancet*, September 2, 1911.) While the use of cocaine or novocaine produces a perfect analgesia, the patient's mind is not at ease. He is alert and apprehensive, and in consequence has difficulty in keeping himself under control. The use of pantopon-scopolamine, however, acts as a sedative to the nervous system and thereby helps the surgeon to perform the operation in hand easily and satisfactorily. In administering the combination, Ramsay advocates the use of a full dose to adults one and a half hours previous to operation, and an additional half-dose if the first is not sufficiently effective. The patient should come to the table without any feeling of nervous dread. A 2 per cent aqueous solution of cocaine hydrochloride is used for instillation, and a 2 per cent solution of novocaine with 39 minims of adrenalin chloride (1:1,000) for injection.

Ramsay has used the combination as an adjuvant in the following operations upon the eye-ball and its appendages. Cataract, glaucoma, irido-sclerectomy in chronic glaucoma, plastic operations on the eyelids, extirpation of the lachrymal sac, and enucleation of the globe. The pantopon-scopolamine acted least satisfactorily in the extraction of cataracts, as there was a tendency, on account of the patient's drowsiness, for the eyeball to roll upward, thereby hindering the delivery of the lens.

Although the use of the combination in no way facilitated the actual operative procedure, the after-effects were all that could be desired. Patients usually went to sleep immediately on their return to bed and slept soundly without any marked effect upon either pulse or respiration.

PARASACRAL ANALGESIA. R. Tolken, Deutsche Medizinische Wochenschrift, January 22, 1914.

PHIMOSIS OPERATIONS LOCAL ANALGESIA FOR. M. Saissi, Presse Medicale, April 4, 1914.

Prognosis in General Anesthesia. V. A. STANGE. *Russky Vratch* (St. Petersburg), January 18.

Stange considers the condition of the heart as the best indication of the patient's ability to withstand general anesthesia. To determine the condition of the cardiac muscle, Stange recommends the so-called respiratory test, that is, the ability to abstain from breathing for some time. Healthy persons can do this from thirty to forty seconds, while those with a weak heart muscle can hold their breath at most from ten to twenty seconds. The test is very simple. The patient, sitting at ease, takes a deep inspiration and closes his mouth, the nostrils being slightly compressed to avoid involuntary expiration; and while the patient is requested to abstain from breathing as long as possible, the seconds are counted. Stange in-

sists that if the breath cannot be held more than twenty seconds, the patient should be operated on under analgesia, or his systemic condition be first improved. He quotes some American insurance companies who do not consider any candidate a good risk who has a respiratory test below forty.

In this connection it is interesting to note that Yandell Henderson in the *Journal of the American Medical Association*, July 25, has a preliminary communication on "The time that Breath can be Held as an Index of Acidosis."

While Stange seems to have no suspicion that his test is based on an apnea due to acidosis, nevertheless he reports observations on a number of chronic diseases in which he finds the duration of voluntary apnea to be abbreviated in about the degree, in which acidosis is known, from the results of other observers, to occur. Lewis, Ryffel, Wolf, Cotton and Bancroft have recently shown that the dyspnea of nephritis is due to an acidosis essentially like that developed in normal persons at great altitudes. Keneway, Pembrey and Poulton have found that by following the alveolar carbon dioxide in diabetics, a warning drop in its tension indicates the approach of coma as long as forty-eight hours before hand and longer than any other method.

Thus voluntary apnea due to acidosis, diagnosed by this simple respiratory test, will serve as a warning to the anesthetist and operator in handling diabetic, cardiac and renal risks.

PROSTATECTOMIES (17) UNDER EXCLUSIVE LOCAL ANALGESIA. F. Legueu, Paris, Journal d'Urologie, June, 1914.

Prostatectomy Under Local Anesthesia. C. W. ALLEN, New Orleans. *New Orleans Medical and Surgical Journal*, February, 1914.

The technic developed by Allen is as follows: One hour before operation a suppository containing 10 grains of anesthesin is placed in the rectum to anesthetize this region and prevent any discomfort when the finger is introduced to elevate the prostate. At the same time a hypodermic injection of morphia 1-6 grain and scopolamin 1-150 grain is administered to lessen psychical disturbances. The bladder is opened under local anesthesia and its walls retracted by long, deep retractors, bringing the field of the prostate into view. Points below the opening of the urethra, near the base of the gland an on either side, are selected for injection on the vesical surface. The needle is passed through the mucosa with the idea of making the injection between the true and false sheath of the prostate, as it is in this plane that the solution must diffuse around the gland and the enucleation is effected. It is here that the large venous plexuses are situated and the nerve filaments are more easily reached as they pass through to the prostate.

Two or three drams of a ½ per cent novocain solution, containing 15 minims of adrenalin to the ounce, are injected at the points mentioned. The needle is then passed into the urethral opening and the lateral walls are similarly injected. An additional injection may be made at the point where very large glands project above the urethral opening. Analgesia is established within five minutes, during which period the adrenalin blanches the prostate. The solution does no harm if injected directly into the gland, but the analgesia is not as effective as when infiltration occurs peripherally between the true and false sheath of the prostate.

This technic blocks all shock from surgical trauma, controls hemorrhage and obviates the systemic complications of general anesthesia, hence its efficacy in reducing the already low mortality in prostatectomy, particularly in bad risks that have had the additional security of preliminary bladder drainage in the two-stage operation.

RECTAL NEUROSES AND OFFICE OPERATIONS, LOCAL ANALGESIA IN. J. D. Reeder, Maryland Medical Journal, February, 1914.

RECTAL ANESTHESIA, DANGERS OF ISOPRAL FOR. P. Kleinschmidt, Berliner Klinische Wochenschrift, February 2, 1914.

RECTAL CASES UNDER LOCAL ANESTHESIA. J. F. Saphir, New York Medical Journal, May 9, 1914.

RESEARCH, ANESTHESIA IN SURGICAL. B. F. McGrath, Rochester, Minn., Surgery, Gynecology and Obstetrics, June, 1914.

RESPIRATION, NATURE OF THE CESSATION OF DURING DEEP ETHER ANESTHESIA. T. S. Githens and S. J. Meltzer, Journal of Pharmacology and Experimental Therapeutics, May, 1914.

Sacral and Local Anesthesia For Laparotomies. M. TRAUGOTT, *Munchener Medizinische Wochenschrift*, May 12, 1914.

Traugott advocates the following preliminary medication: The evening before the operation the patient receives 0.5 gram of veronal; one and a half hours before the operation a combination of pantopon-scopolamine is injected subcutaneously, the dose being repeated one-half hour before operation, or during the operative procedure if the patient becomes restless.

The spinal injection is made with the patient in the knee-chest position. If bleeding occurs through the trocar, the needle is slightly withdrawn and the body of the patient elevated. Ten to twenty c.c. of salt solution are injected, followed by an equal amount of a 1 per cent novocain solution, the pulse and respiration being carefully observed.

The accidental injection of the novocain solution into a vein causes immediate acceleration of the pulse and respiration.

The technic was applied in a long series of laparotomies, including hysterectomies, appendicectomies, nephrectomies and ovariotomies, and in fifty per cent of the cases the sacral analgesia was completely satisfactory. In 38 per cent an additional volatile anesthetic had to be administered, and in 6 per cent the method had to be abandoned owing to pain and the failure of the musculature to relax.

SACRAL ANESTHESIA: EPIDURAL INJECTIONS. E. Zweifel, Munchener Medizinische Wochenschrift, March 31, 1914.

SPINAL ANALGESIA. J. M. Bartrina, Presse Medicale, January 3, 1914.

SPINAL ANESTHESIA WITH NOVOCAIN. S. Mercade, Journal de Chirurgie, January, 1914.

SPINAL ANESTHESIA, EXPERIENCES WITH IN PELVIC SURGERY. B. M. Anspach, Philadelphia, American Journal of Obstetrics, May, 1914.

SPINAL ANALGESIA AND SHOCKLESS OPERATIONS. J. Morley, Medical Chronicle, Manchester, January, 1914.

Submucous Resection of the Nasal Septum, Satisfactory Local Analgesia For. J. J. KING, New York City. *Journal American Medical Association*, May 30, 1914.

Following a preliminary dose of scopolamine, 1-150 gr., one-half hour previous to operation to allay nervousness and act as a therapeutic antagonist to cocaine, King, with a cotton-wool applicator, applies a 20 per cent solution of cocaine over every part of the mucous membrane of the septum, the application being immediately repeated. This is succeeded by a similar application of a 1:1,000 epinephrin solution, Then 8 to 10 c.cm. of sterile salt solution, to which 5 minims of a 1:1,000 epinephrin solution have been added, are injected under the septum perichondrium and periosteum on each side. This infiltrates every portion of the septum membrane, blocks off the nerves, prevents shock and renders the operation practically bloodless. It also aids in elevating the perichondrium from the cartilage, thereby facilitating dissection. King limits himself to 5 minims of the epinephrin solution, as this dose is well within the toxic limits of the drug, and is sufficient to render the operative field bloodless.

TOXICATION, INCREASE OF ETHER, BY NEW METHOD OF ADMINISTRATION. R. C. Coburn, New York, Journal American Medical Association, January 31, 1914.

TONSILLECTOMY IN THE UPRIGHT POSITION UNDER ETHER. W. H. Roberts, Pasadena, Cal., Laryngoscope, February, 1914.

UROLOGY, REGIONAL AND LOCAL ANALGESIA IN. G. Lemoine, Journal d'Urologie, May, 1914.

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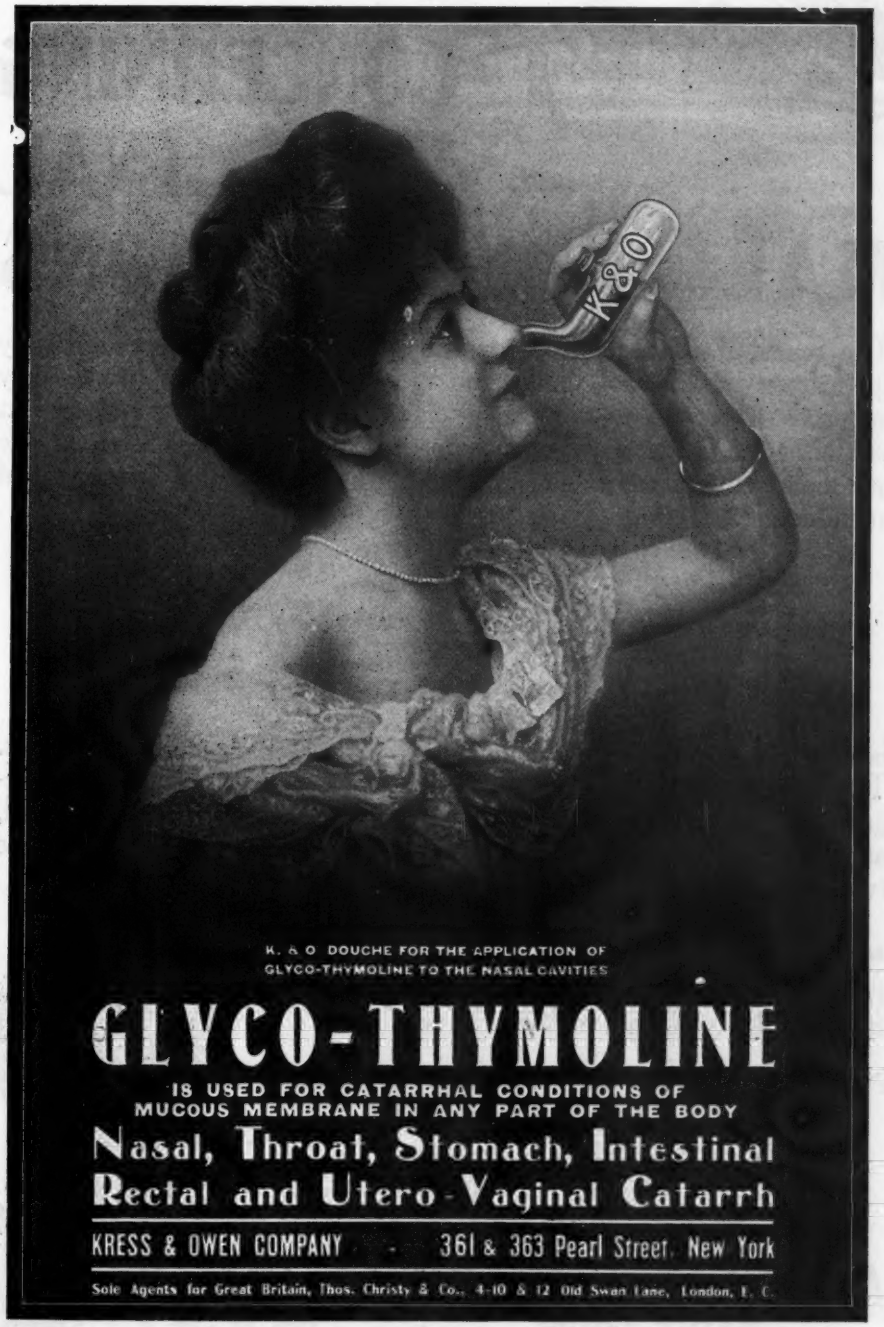

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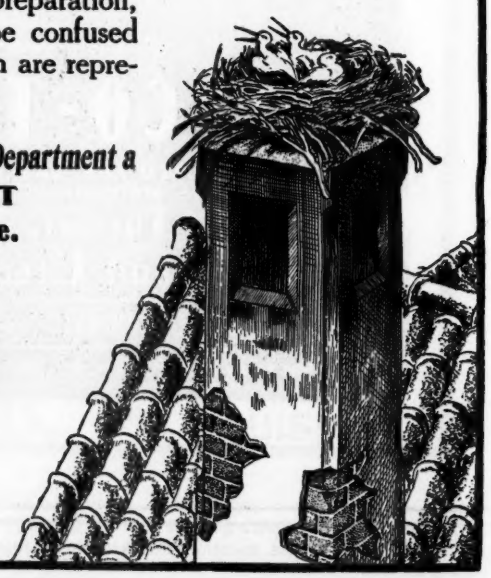

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"Have had a run on Pneumonia this spring. Used Antiphlogistine in every case. All recovered."
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"I wouldn't care if I were the only physician in the city using Antiphlogistine for Pneumonia—especially in children—for it saves many a child's life."
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Antiphlogistine is prescribed by Physicians and supplied by Druggists all over the world

"There's only ONE Antiphlogistine"

THE DENVER CHEMICAL MFG. CO., NEW YORK

Send for our "Pneumonia" Booklet, if one has not been received

AN IMPORTANT IMPROVEMENT

Tube-Point Glycerinized Vaccine

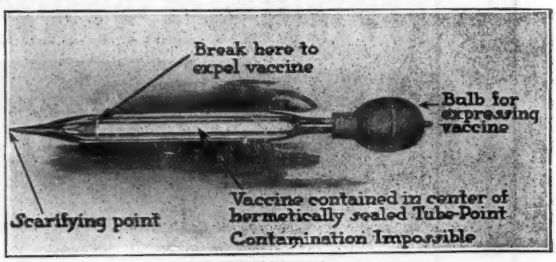
The Mulford Tube-Point is the greatest advance made in perfecting Vaccine Virus.

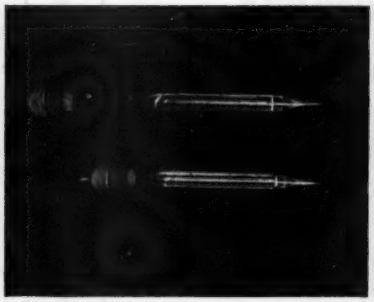
It furnishes a sterile point for immediate use.

It is made entirely of one piece of glass, which is easily sterilized; no joints to become loose and allow contamination of the virus.

The vaccine is hermetically sealed within the tube-point and cannot be contaminated.

The tube-point is easy to use and does not suggest any cutting or surgical operation to the patient.


Break here to expel vaccine
Bulb for expressing vaccine
Scarifying point
Vaccine contained in center of hermetically sealed Tube-Point
Contamination Impossible



1. Place the rubber bulb over the small end of the tube-point, so that the end of the glass tube protrudes through it.

2. Scarify with the point, drawing no blood.

3. Break the tube inside the bulb.

4. Remove end of capillary tube from bulb.

5. Break off the point at the file mark.

6. Expel the virus from the tube directly on the scarified area by means of the rubber bulb and rub in the virus with end of the tube.

Dr. J. N. Hurty, Secretary of the Indiana State Board of Health and an Ex-President of the American Public Health Association, commends our new tube-point, as follows:

"We are glad to receive your new vaccine points.
"I believe these points reach perfection. It may now be said that the vaccine administration problem has been settled. The idea is easily the best one yet invented. I shall distribute a few of these to some of our most active health officers, telling them where the points came from, and recommending them.
"I congratulate you most heartily upon this advanced improvement over previous-style points."

This will be your opinion after vaccinating with the new tube-point. Sample tube-point mailed free on request.

Supplied in packages containing 10 Tube-Points (10 vaccinations), and in packages containing 1 Tube-Point (single vaccination).

For a reliable vaccine, the preparation of which is surrounded with all of the safeguards that science has devised, SPECIFY "MULFORD VACCINE TUBE-POINT."

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Professor Cluss is the Director of the Royal and Imperial Brewers' Academy of Vienna and is the leading authority abroad on brewing; his standing in the scientific world precludes suspicion that any authoritative statement from him is other than gratutitous. In "Zeitschrift fuer das gesammte Brauwesen," the leading brewer's journal of Germany (issue No. 20, May 20th, 1911), he characterizes our produce as "America's Finest Pure Malt Beer."

Dr. Robert C. Schupphaus, an authority in his field, is a contributor to Thorpe's "Dictionary of Applied Chemistry," over whose signature we are prepared to furnish certificates of analysis proving the purity and value of our beers from chemical, biological and physical viewpoints.

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Tuesdays, Wednesdays
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2.00—4.00 p. m.

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Pioneer work in disseminating the doctrine of cleanliness has always been done by physicians of every community. All doctors know that without cleanliness there is disease, hence without soap there is no health.

Most doctors, for sanitary and prophylactic reasons, now use Synol Soap, the antiseptic liquid soap, because they know that it sterilizes the skin far better and more certainly than any other non-injurious preparation. These reasons alone would suffice to recommend Synol Soap to your patients. But there are other and many more potent reasons why the following suggestions from the doctor as to the use of Synol Soap will be more than welcome in every home, and may help to prevent sickness.

"The cake of soap is unsanitary. Everybody in the house uses it, some of the dirt from the hands remains on the soap, and there you have a mixture of soap and dirt, multiplied with each successive use. *This may cause disease.*

"There may be a contagious disease in your house. Your little child has scarlet fever, or measles. To enter the sick room, or to take care of the patient, may not infect you, but your hands may carry the disease to others. *This is how diseases are spread.* Washing the hands with Synol Soap reduces the chances for infection to a minimum.

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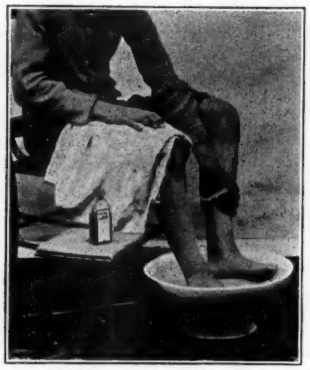
Given a soap which is, to the doctor, a valuable cleansing and sterilizing agent, it is but reasonable to expect that it will serve the same purpose to the patient. Synol Soap can be used wherever and whenever a soap needs to be employed, no matter if it be to wash a baby's skin or sterilize a surgeon's hands.



In diluted form it makes an excellent mouth wash. It is the most effective soap for a shampoo, especially in seborrheic conditions of the scalp; in the bath it will cleanse the body thoroughly, open the pores, and destroy bacterial accumulations on the skin surface.

Synol Soap does not irritate the skin or mucous membrane, is refreshing and has the characteristic "clean" odor.

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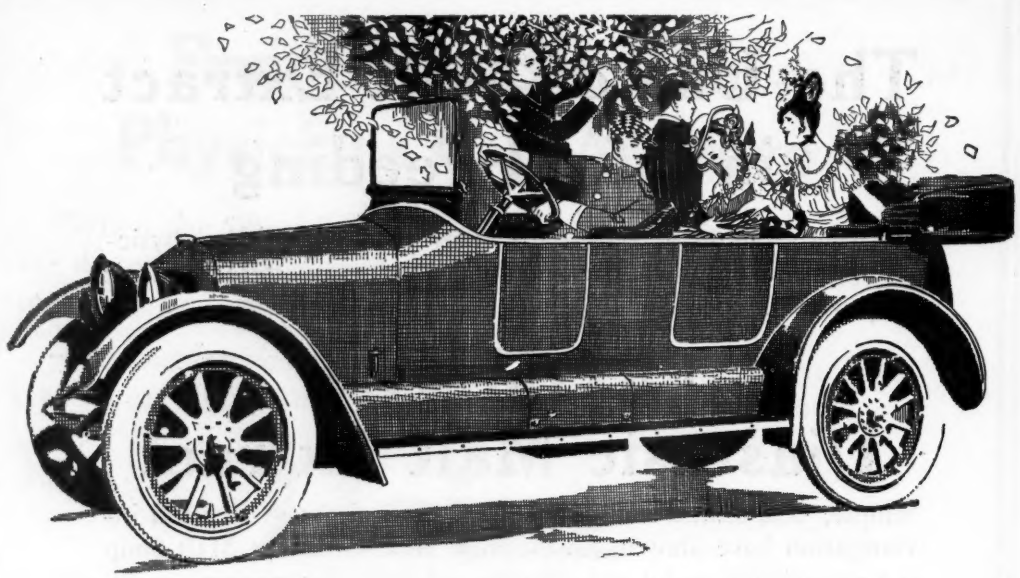

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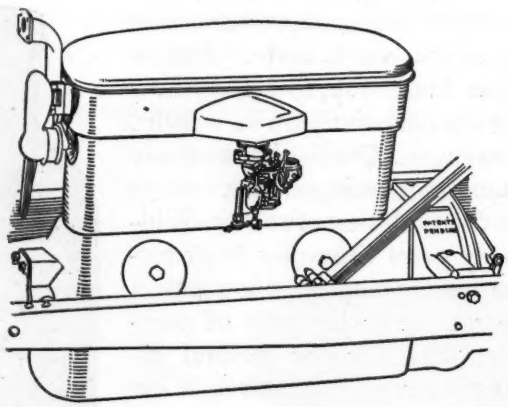

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Ventilated Models

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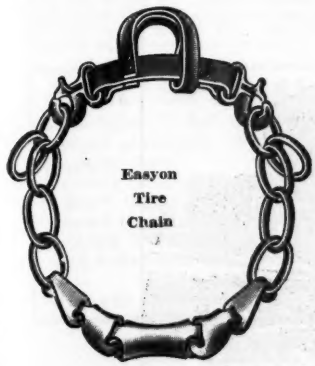

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They give perfect traction.

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These remain unchanged. The leather covers nearly the whole tire and the sides are studded with flat-head rivets to prevent undue wear on rocky or rutted country roads.

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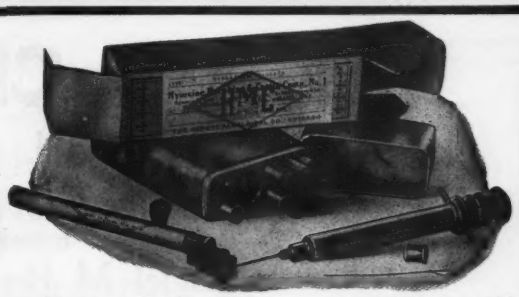

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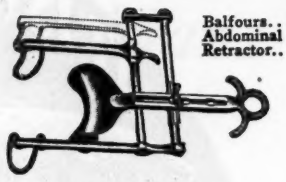

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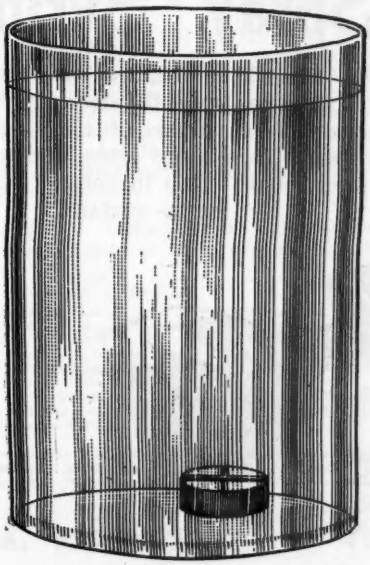

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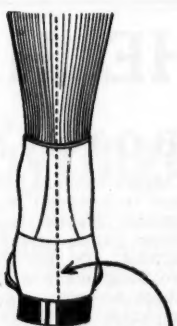

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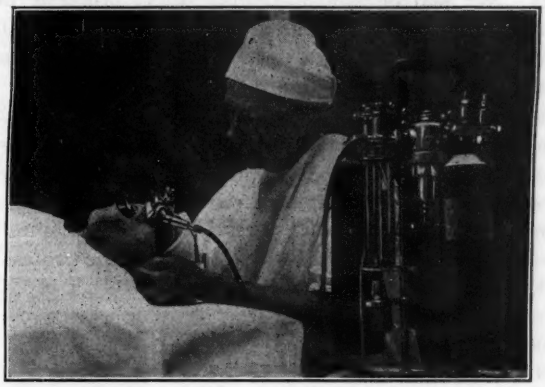

FIG. 3.—Apparatus with nasal tube attached for oral surgery.

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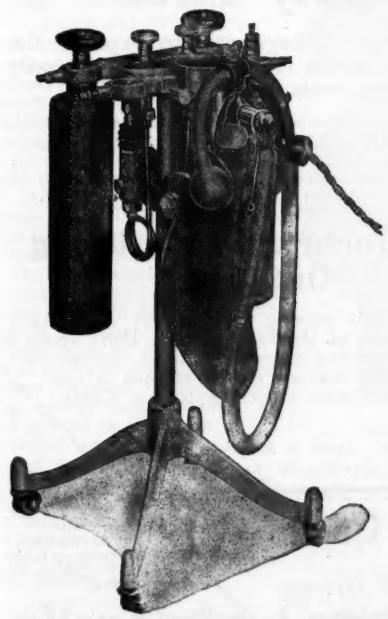

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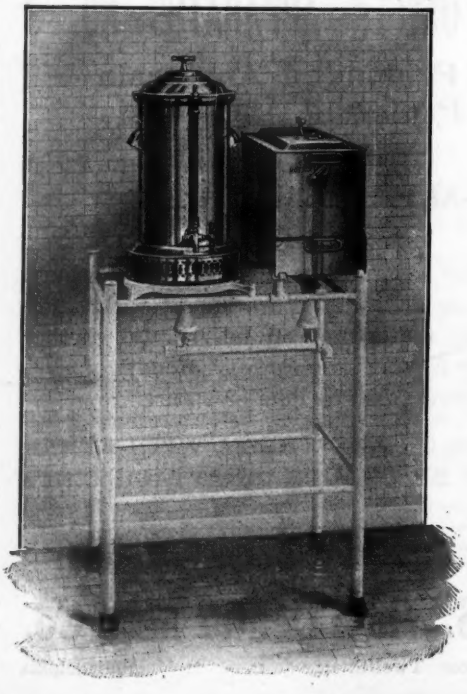

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Boil 1 cup of Barley in 2 cups of water in double boiler for an hour. Remove from fire, add one can **Kornlet**, 1 pint milk, 1 tablespoon butter, season with salt and a teaspoon of sugar. Let boil up once, stirring steadily, then rub through a sieve. This will be found good for a feverish patient, allaying both thirst and hunger — also for babies requiring especially strengthening food.

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talsis by over-stimulation, and that the best stimulant of intestinal muscles is the intestinal secretions.

Pil. Cascara Comp. Robins contains no Strychnine to force the musculature, nor Belladonna to inhibit the secretions. On the contrary, it stimulates the flow of secretions and normalizes peristalsis. It is, in fact, a Normal Cathartic.

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The value of a properly made analysis of urine, blood, feces et cetera and a comprehensive report of the findings as an aid in diagnosis, is being more broadly and generally appreciated by the general practitioner of medicine.

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1-123-grain Strychnine to teaspoonful.

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It is a Stomachic Tonic, and relieves Indigestion, Flatulency, and has the remarkable property of arresting vomiting during pregnancy. It is a remedy of great value in Gastralgia, Enteralgia, Cholera Infantum and Intestinal Derangements, especially those of an inflammatory character. For nursing mothers and teething children it has no superior. Besides more digestive properties, Pepsin and Pancreatine have powerful soothing and sedative effects, and are therefore indicated in all gastric and intestinal derangements, and especially in inflammatory conditions. It is perfectly miscible with any appropriate medium. In certain cases the addition of Tr. Nux Vomica gives much satisfaction. Please write for *Peter's Peptic Essence Comp.* and you will not be disappointed. These preparations are held strictly in the hands of the medical profession, never having been advertised as popular remedies, nor put up with wrappers and circulars expatiating on the use of the Hypophosphites or Digestives, thus educating the public in the use of these valuable compounds.

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Pluto Water possesses, in addition to the properties of plain water, a mildly tonic effect upon the mucous membranes of the stomach, due to both its gases and its salts, and, owing to its water and its salts, it is also diuretic. It is exceedingly useful, when taken half an hour before meals, to cleanse the gastric membranes and to prepare it for the reception of food. It also serves to dilute and wash out waste material from the system through the kidneys. Patients will usually drink Pluto Water who will not, or cannot, drink sufficient ordinary water. A glass taken an hour or two after a meal promotes digestion, and helps remove the effete products from the blood. In fevers it is always useful and should be given freely; and it often allays nausea and vomiting. In short, Pluto Water has a distinctive place and value in metabolic therapy—a fact which is widely recognized and testified by the way in which it is used and prescribed by physicians everywhere.

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Laboratory work is now regarded as one of the most important phases of modern medicine. Many excellent and progressive practitioners have never had the opportunity to avail themselves of it, and later graduates who begin doing their own laboratory work find that they are not up with the advances made in this science. No physician can afford to be uninformed on this subject and the up-to-date methods of making analysis. The publishers of the Detroit Medical Journal, in order to increase the efficiency of their paper, have perfected arrangements with Drs. Snure and Owen of the Detroit Clinical Laboratory to edit a series of lessons on this important phase of medicine. The first lesson appeared in the February issue, but those desiring the complete course to date may have the same by writing at once and sending one dollar for a year's subscription, to begin with that issue.

We heartily commend the work which the Detroit Medical Journal is doing, for the reason that many physicians will be taught the great advantages of laboratory work as a diagnostic aid and while they may not possibly care to devote their time to the actual work and prefer to have their analysis made by some of the well established laboratories, the information which they will gain from this course will prove of untold value.

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Copy of this pamphlet will be sent upon request made to the above-mentioned firm.

ASTHMA.

Few diseases can cause more real suffering and distress than asthma. For this reason, as well as the well-known tendencies of each attack to aggravate and increase any existing cardiac or circulatory weakness, the most careful and faithful attention should be given to its treatment. Many and various are the measures that have been employed, but among clinicians of the widest experience, iodine in one form or another is generally recognized as the most efficient remedy for reducing the frequency and severity of paroxysms of this disease. Of course, the immediate treatment of an attack calls for measures to relieve the spasm and attendant distress as quickly as possible. But when this is accomplished, efforts to prevent or reduce to a minimum future, attacks must be promptly instituted, and it is in this direction that iodine has proven its efficiency.

As in all other instances, however, where iodine has been indicated, the gastric irritation that has usually resulted from the particular salt or preparation of iodine employed has all too often made it impossible to administer this potent remedy as continuously or in as large dosage as needed to produce the desired results.

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In the treatment of few diseases in which iodine is indicated has Burnham's Soluble Iodine proven more efficacious than in asthma, and because it can be used in appropriate dosage for long periods without interruption, the results are usually most gratifying. It is not at all surprising, therefore, that Burnham's Soluble Iodine is so often turned to by physicians as a matter of course in the treatment of asthma.

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It is freely conceded that the drugs or remedies that can be relied upon to produce definite and uniform physiologic effects are limited in number. The great majority of drugs depend so largely on dosage, the conditions under which they are administered, and individual idiosyncracy, that the effects that result are in most instances decidedly uncertain and only to be determined in actual test. There are a few drugs, however, that have a well defined action, which the practitioner can be sure will follow with practical certainty. Among such definite acting medicaments the bromides are particularly noteworthy, for there are few drugs that are more positive, pronounced and definite in their power to modify or influence certain of the physiologic conditions of the body. But clearly defined as is bromide action generally, even this has been found more or less subject to the purity and quality of the drugs employed.

It is recognition of this fact that leads so many discriminating physicians, when bromide-therapy is indicated, to turn to Peacock's Bromides, for experience has shown that this product is not only made from neutral bromide salts of the highest purity and quality, but compounded with a degree of care and skill that assures constant unvarying uniformity. It is not surprising, therefore, that Peacock's Bromides are so generally considered the ideal bromide preparation, as well as the most reliable sedative, anti-spasmodic and anti-convulsive. But it is not alone to therapeutic efficiency that the popularity of Peacock's Bromides is due. The more this combination has been used the more evident it has become that its purity and quality guarantee a gratifying freedom from the gastric disturbance and other symptoms of bromism that the ordi-

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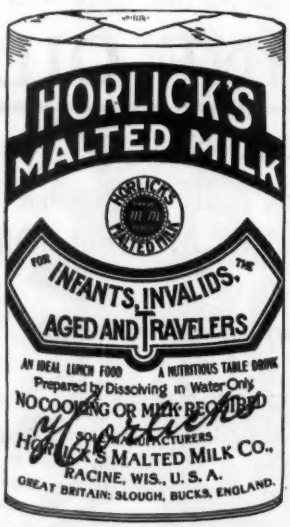
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nary bromide salts usually produce. Consequently in employing Peacock's Bromides, the painstaking practitioner not only insures the therapeutic results he desires, but saves his patient from disagreeable and annoying effects that he would be sure to suffer from inferior preparations of the bromides. Is it difficult to understand, therefore, why Peacock's Bromides are so generally employed or prescribed when bromides are indicated?

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To keep the alimentary tract as free as possible from fermentable matter, to inhibit as far as possible the activity of the putrefactive bacteria which normally inhabit the intestinal canal, and to eliminate the toxin produced by the Bacillus Typhosus as rapidly as possible are desirable results to accomplish in treating Typhoid cases.

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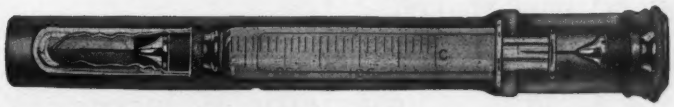

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If you have never prescribed this valuable remedy which has been used with constant satisfaction by the profession nearly twenty years, or if in trying out the many preparations before you to-day, you have temporarily lost sight of the excellence of *Robins'*—the original Pil. Cascara Comp.—read their advertisement in this issue and write for samples. We believe a comparative test will prove these pills the *best* you have ever used.

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STIMULATES THE APPETITE
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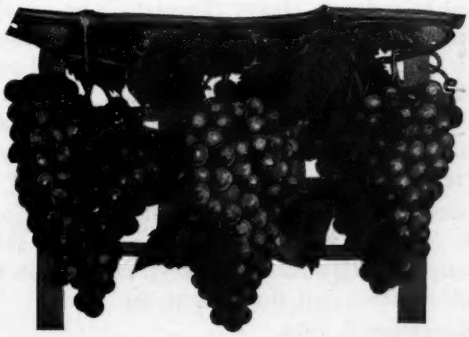

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The Löwenthal firm appealed against this decision and the Supreme Court of Judicature (Kammergericht), having heard the appeal, dismissed it. In the course of its judgment the Court stated that the incorrectness of the firm's statements had been proved. Thoms, Virchow, Aufrecht, Gilbert and Frank (the last engaged on behalf of the accused firm), arrived at the conclusion that the total content of sulphur in the two preparations is different; further, that the content of sulphidic sulphur in the two products also differs, ichthyol exceeding that of the substitute in the proportion of eleven to two.

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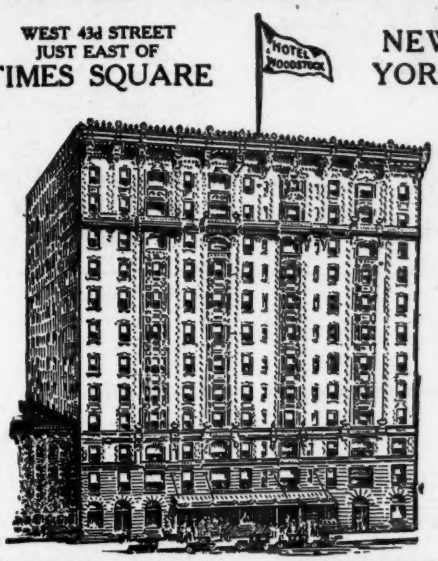

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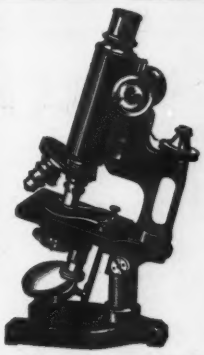

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BOGART, J. BION	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Mon., Weds. & Fri.	9.00 A.M.	Dec. 1st to Mar. 31st.
BRINSMADE, W.	Long Island College Hospital, Henry & Pacific Sts.	Mon. & Fri.	10.00 A.M.	
BRISTOW, A. T.	Long Island College Hospital, Henry & Pacific Sts.	Mon. & Fri.	10.00 A.M.	
CAMPBELL, W. F.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Tues., Thurs. & Sat.	9.00 A.M.	Aug. 1st to Nov. 30th.
FOWLER, RUSSELL S.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Tues. & Sat.	2.00 P.M.	Continuous service.
FOWLER, RUSSELL S.	German Hospital, St. Nicholas Ave.	Mon., Tues., Thurs. & Fri.	10.00 A.M.	
		Tues., Thurs. & Sat.	3-6 P.M.	
GOODRICH, CHARLES H.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Tues., Thurs. & Sat	9.00 A.M.	Apr. 1st to July 31st.
RUSHMORE, J. D.	Long Island College Hospital, Henry & Pacific Sts.	Weds.	2.00 P.M.	
SHERWOOD, W. A.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Mon., Weds. & Fri.	9.00 A.M.	Aug. 1st to Nov. 30th.
SPENCE, THOMAS B.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Tues., Thurs. & Sat.	9.00 A.M.	Dec. 1st to Mar. 31st.
WARBASSE, JAMES P.	German Hospital, St Nicholas Ave.	Tues., Thurs.	9 A.M. to 1	
		Mon., Weds. & Fri.	3-6 P.M.	

GYNECOLOGY—OBSTETRICS

HOLDEN, F. C.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Daily	9 to 10.30 A.M.	Alternating every four months
HUMPSTONE, O. P.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Daily	9 to 10.30 A.M.	Alternating every four months
HYDE, C.	Long Island College Hospital, Henry & Pacific Sts.	Weds.	11-12 A.M.	
JUDD, A.	Long Island College Hospital, Henry & Pacific Sts.	Sat.	10-12 A.M.	
McNAUGHTON, G.	Long Island College Hospital, Henry & Pacific Sts.	Sat.	10-12 A.M.	
POLAK, J. O.	Long Island College Hospital, Henry & Pacific Sts.	Thurs.	9-12 A.M.	
POOL, W.	Long Island College Hospital, Henry & Pacific Sts.	Weds.	11-12 A.M.	
WEISBROD, FRANK	German Hospital, St. Nicholas Ave.	Weds. & Sat.	9 A.M.-1 P.M.	

ORTHOPEDIC SURGERY

NAPIER, C. D.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Thurs.	2.00 P.M.	Continuous service.
RUSHMORE, J. C.	Long Island College Hospital, Henry & Pacific Sts.	Fri.	2.00 P.M.	

GENITO URINARY.

MORTON, H. H.	Long Island College Hospital, Henry & Pacific Sts.	Thurs.	3-5 P.M.	

EYE, EAR, NOSE AND THROAT

DRODGE, J. H.	German Hospital of Brooklyn, St. Nicholas Ave.	Mon. & Wed.	1-3 P.M.	Nose, Throat & Ear.

SCHALCK, ERNST	German Hospital of Brooklyn, St. Nicholas Ave.	Tues., Wed., Fri. & Sat.	1-3 P.M.	Eye.
STICKLE, C. W.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Weds.	2.00 P.M.	Continuous service. Throat Dept.
STURGESS, P. H.	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	Mon.	2.00 P.M.	
WOOD, J. SCOTT	Methodist Episcopal Hospital, 6th St., 7th to 8th Aves.	By appointment.	By appointment.	Continuous service. Eye Dept.

NEW YORK

SURGERY

DOCTOR'S NAME.	HOSPITAL.	DAY.	HOUR.	REMARKS.
BAGG, C. L.	Metropolitan Hospital, Blackwell's Island		2.00 P.M.	On service two months in the year. No definite time specified.
BISSELL, J. B.	Bellevue Hospital, 1st Ave. & 26th St.			Any time, any day, as cases come in.
BREWER, GEORGE E.	Roosevelt Hospital, 59th St. West	Tues., Thurs.	2.15 P.M.	
		Sat.	3.15 P.M.	Oct. 1st to June 1st.
BRICKNER, W. M.	Mt. Sinai Hospital, 5th Ave., 100th to 101st Sts.	Tues. & Fri.	2.00 P.M.	
BRYANT, J. D.	Bellevue Hospital, 1st Ave. & 26th St.			Any time, any day, as cases come in.
COE, H. W.	Bellevue Hospital, 1st Ave. & 26th St.	Weds.	9-11 A.M.	
		Sat.	3-5 P.M.	
COLEY, WM. B.	General Memorial Hospital, 106th St. and Central Park	Weds.	9.00 A.M.	
		Thurs.	2.30 P.M.	
COLEY, WILLIAM B.	N. Y. Society for the Relief of the Ruptured and Crippled, 321 East 42d St.	Fri.	8.30 A.M.	
COLLINS, H. D.	City Hospital, Blackwell's Island	Mon., Weds., Fri.	P.M.	
DARRACH, WM.	Roosevelt Hospital, 59th St., West	Fri.	2.30 P.M.	June 1st to Oct. 1st.
DAWBARN, R. H. M.	City Hospital, Blackwell's Island	Mon., Weds. & Fri.	P.M.	
DOUGLAS, J.	Bellevue Hospital, 1st Ave. and 26th St.			Any time, any day, as cases come in.
DOWD, CHARLES N.	Roosevelt Hospital, 59th St., West	Tues. & Thurs.	9.30 A.M.	June 1st to Oct. 1st.
DOWD, CHARLES N.	General Memorial Hospital, 106th St. & Central Park	Weds.	2.30 P.M.	
		Sat.	9.00 A.M.	
DOWNES, WM. A.	General Memorial Hospital, 106th St. & Central Park	Weds.	9.00 A.M.	
		Thurs.	2.30 P.M.	

(*List continued from November issue. See list each month.*)

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